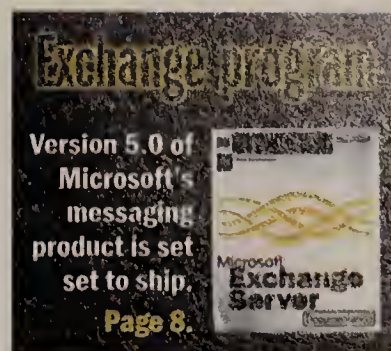


NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



Big Blue to revitalize with switching product barrage

By Michael Cooney
Raleigh, N.C.

IBM is out to prove switching is where it's at in 1997.

The company next week will launch a barrage that will include products ranging from a new 12G bit/sec Super Hub and switching modules to software that will help users set up large VLANs.

The company is also expected to announce that four vendors, possibly including Cascade Communications Corp. and Xylan Corp., have bought IBM's ATM technology, called Prisma, for use in their own products.

The battered IBM networking division is rushing to refresh its product line and woo new

IBM is revisiting its mainframe connectivity course, says VP Rick McGee. Story on Page 11.



STEVE BORN

users. IBM also hopes the products will give it a leg up on vendors such as Cisco Systems, Inc. and Cabletron Systems, Inc. that are also trying to build end-to-end switching packages.

See IBM, page 11



"We are clearly not in the dominant role we'd like to be in the networking space, but we feel that our product introductions this year will change that."

Lutz Hahne, general manager, IBM's Networking Hardware Division

Microsoft plugs browser hole

Hostile Java applet was able to violate users' hard drives.

By Ellen Messmer
and Carol Silwa
Redmond, Wash.

If your shop uses Internet Explorer 3.0, get ready to download — fast. Microsoft Corp. has issued a patch that claims to plug

a hole preventing hostile Java applets from rooting around inside your hard drive.

Credit London-based A.L. Digital Ltd. with showing how a hostile Java applet downloaded

See Microsoft, page 9

STIR IN OUR JAVA SECURITY LINKS:

- Patches to plug the hole in Internet Explorer
- Live examples of malicious applets
- Java security FAQs

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3Com/U.S. Robotics primes product plan

By Jodi Cohen

Ignoring his long-held belief that mergers of equals are next to impossible, 3Com Corp. Chief Executive Officer Eric Benhamou last week agreed to acquire remote access giant U.S. Robotics, Inc. through a \$6.6 billion stock swap.

Why take the risk? According to Benhamou, U.S. Robotics' remote access servers and modems give 3Com the products it needs to compete with Cisco Systems, Inc. in the drive to satisfy customers looking for end-to-end internetwork products.

To ensure the acquisition succeeds, 3Com has started making important decisions about product-line consolidation. Benhamou said the combined company will back U.S. Robotics' 56K bit/sec modem technology, kill off 3Com's carrier-class remote access server, and phase out U.S. Robotics' AmberWave, Inc. and Scorpio Communica-



3Com CEO Benhamou celebrates with U.S. Robotics CEO Casey Cowell.

tions LAN and ATM switches.

The merger — the data network industry's biggest ever — catapults 3Com into a neck-and-neck race with Cisco, with both companies generating about \$5 billion in annual revenue. That is roughly twice the revenue of the

nearest competitors, Cabletron Systems, Inc. and Bay Networks, Inc.

"This merger will obsolete the phrase 'Big Four,'" said Benhamou, who will remain CEO of the double-size 3Com.

One analyst said the merger is good for the industry. "Now we finally have a viable option to Cisco," said Skip MacAskill, an analyst with Gartner Group, Inc. of Stamford, Conn. "This really

See 3Com, page 10

BENHAMOU SPEAKS

3Com chief comments on U.S. Robotics, industry consolidation, competition and product overlap. Page 10.



STEVE BORN

Top ISPs tackle Web site woes with global hosting

By Denise Pappalardo

Do performance problems have Web visitors from abroad leaving your site in disgust? Three of the top ISPs claim they have a solution: international Web hosting services.

PSINet, Inc. and UUNET Technologies are expected to announce their service plans as early as this week, while BBN Planet is slated to roll out its still unannounced services early next quarter.

The ISPs will provide customers with dedicated or shared servers in the U.K., Europe, Japan or

any other country they support. By eliminating several hops and a journey under the Atlantic, international Web visitors are expected to experience vastly improved performance.

"The main thrust of international Web site hosting is better performance," said Matt Nerney, senior research analyst at Aberdeen Group, Inc., a Boston-based consulting firm.

Some services have already trickled out. For instance, Herndon, Va.-based PSINet has been offering its PSIWeb Web hosting

See Web, page 8

Andreessen crafts Netscape strategy for extranets

By Carol Silwa
and Ellen Messmer

At next week's Internet World show in Los Angeles, Netscape Communications Corp. will latch on to a new buzzword — extranets.

That will be the focus of a white paper and presentation from Netscape cofounder Marc Andreessen, who will outline the company's long-term plan for facilitating business-to-business transactions and collaboration over the Internet, sources famil-

See Netscape, page 8

**When's the best time to talk about
remote access expertise?**

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Find out more for yourself by calling 1-800-778-3632 ext. 189000 for our free Product Selection Tool and Telecommuting Guide on CD. Or visit us on the Web at www.cisco.com/access/dialup/

We can help you make sure your people get the information they need when they need it, with a remote access solution that works. Pure and simple.

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Sprint's bold deployment of self-healing SONET rings is anything but a cause for alarm—except for the competition. Because

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has deployed international SONET ring technology for the highest standard in reliable data transmission.

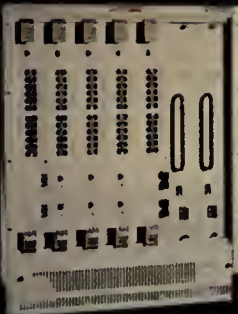
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GET SMARTER

Cabletron introduces high-performance, aggressively priced SmartSwitch devices. Page 23.

REPEAT AFTER ME

Start-up Packet Engines revs up a Gigabit Ethernet repeater, distinguishing itself from the Gigabit Ethernet switch pack. Page 6.



LEAVE THE HOSTING TO US

UUNET's Dave Foster promotes the outsourcing of Web hosting. Page 19.



FIND IT ON FUSION

To quickly get to any online info referenced in *Network World*, type its DocFinder number in the input box on the home page.



This Week

Only on Fusion

- **Web servers.** Are Macintoshes more secure Web servers than Unix or NT machines? A Swedish company is offering a prize to anyone who can crack its Mac-based Web site. But some Mac aficionados are worried about what happens when Apple swaps in OS components from its new subsidiary, NeXT, which they say are easier to break into. **DocFinder: 0945**
- **Remote access.** Microsoft plans to beef up the remote access capabilities of NT. It wants to integrate Citrix's WinFrame software but will build its own — or go elsewhere — if the two companies cannot come to a licensing deal. **DocFinder: 0946**
- **Network computers.** Oracle will use a variant of Berkeley Unix as an operating system for at least some of its upcoming NC devices. **DocFinder: 0947**

This Week

- **Mergers.** See how 3Com's and U.S. Robotics' stock prices have changed since they announced their merger last week, and read an article on why 3Com might become a major ATM player. **DocFinder: 0941**
- **Security.** Read up on NT security with our collection of white papers and FAQs. **DocFinder: 0943**
- **Messaging.** Even as Microsoft releases its new Exchange 5.0 mail server, observers differ on how good its new Outlook mail client is. Read dueling columns from our own Dave Kearns and Daniel Blum. **DocFinder: 0944**

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QuickATM wants you to surf the Web during those long waits in the airport. Page 54.

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REVIEW: Microsoft comes out on top in a showdown of five document conferencing tools. Page 40.



LYDIA HESS

News briefs, March 3, 1997

Novell financials off; CEO search continues

Still struggling to turn things around, Novell, Inc. last week reported first-quarter earnings, which fell below its own expectations and those of Wall Street. For the period ended Jan. 31, Novell reported revenue of \$375 million and earnings of \$50.8 million. The revenue was off 15% compared to first-quarter revenue last year, and earnings tumbled 20%. Novell President Joe Marengi said the numbers were lower than anticipated due to lagging sales in Japan and Europe. But industry analysts attributed slow growth to a lack of confidence in the company's direction, including its six months-and-counting search for a chief executive officer. Marengi said the appointment of a new CEO in the next 30 days, the announcement of Internet-based security services and upcoming releases of all the company's flagship products should boost customer confidence and product sales later this year.



Marengi

Cisco finds security

Cisco Systems, Inc. last week announced the Enterprise Security Alliance, a group of seven vendors striving to agree on and promote new security standards, develop auditing tools and test interoperability of security wares. Other members of the alliance include Cylink Corp., Hewlett-Packard Co., Microsoft Corp., Oracle Corp., RSA Data Security, Inc., Security Dynamics, Inc. and VeriSign, Inc.

Separately, Cisco and Olicom A/S said they are developing "second-generation" token-ring switches with ATM uplinks. The first of the switches is expected to ship in the second half of this year.

The Apple of Bill's Eye

Yes, the computer industry was notably represented on the Clinton Administration's list of 938 people who spent a night at the White House. Apple Computer, Inc. cofounder Steven Jobs turned up under the category "Friends and supporters" — and for good reason. Last year, he contributed \$100,000 to the Democratic National Committee as well as \$50,000 to the Democratic Senatorial Campaign Committee.

**Name calling**

An Internet domain name registry last week filed a lawsuit in a California court to halt implementation of a plan to create seven new top-level domains. Christopher Ambers, president of Image Online Design of San Luis Obispo, Calif., alleged the Internet Assigned Numbers Authority (IANA) reneged on an agreement made last year to give the company exclusive rights to register names in the ".web" domain. Last month, a committee formed by IANA and the Internet Society announced a plan to sell by lottery the seven new top-level domains, including .web.

Netscape signs off on objects

Netscape Communications Corp. last week announced that its client software will include support for signed objects to guard against the risk of uncertified Java applications downloaded from the Internet. Developers who want to write applications that go outside the Java sandbox to gain access to a user's hard drive for a targeted purpose can cryptographically sign a piece of code and specify the capabilities they want the object to have. A user's machine can be configured to accept only objects that are signed by trusted sources.

As if being bought out wasn't enough

U.S. Robotics, Inc. last week shipped its first 56K bit/sec-capable modems amid the clamor of just about everyone else in the modem industry ganging up on the company by forming a new group called the Open 56K Forum. The forum will conduct interoperability tests, among other things.

Start-up unveils Gigabit Ethernet repeater

By Jodi Cohen

Spokane, Wash.

Start-up Packet Engines, Inc. wants to jump-start your network with Gigabit Ethernet repeaters, not switches.

The company's full-duplex Gigabit Ethernet repeater — the first such product scheduled to hit the market — will give customers higher performance at a relatively low-cost entry point (NW, April 29, 1996, page 1).

Packet Engines' FDR12 repeater provides 12 full-duplex Gigabit Ethernet ports — with a maximum multimode fiber-link length of 200 meters — for connecting high-speed workgroups. The repeater also has a cascade port for connecting to other repeaters and Gigabit Ethernet switches, allowing the FDR12 to provide campus or building links up to 3 kilometers long.

The 14th port provides a 10M/100M bit/sec Ethernet autosensing connection to net resources such as E-mail. This port is connected to the Gigabit Ethernet full-duplex repeater via a translation bridge.

The repeater works by feeding traffic onto the wire from one station at a time, arbitrating bandwidth contention and providing what some company offi-

cials call "carrier-sense multiple access with collision detection in a box." The combination of per-port buffers with full-duplex links creates an Ethernet system where access decisions are contained within the repeater, said Brian MacLeod, director of marketing at Packet Engines.

The repeaters can be managed using popular Web brows-

ers to choose a repeater over a switch. But at least one analyst said the need for shared-media Gigabit Ethernet products will win over some customers.

"You're going to need to support the installed base, so there's certainly a demand for this type of gig repeater product early on," said Esmerelda Silva, an analyst at International Data

Packet Engines

Product: FDR12 Gigabit Ethernet full-duplex repeater

Function: High-performance workgroups, high-speed backbones and server farms

Price: Expected to be between \$1,000 and \$2,000 per port

Availability: June



ers and SNMP-based management platforms.

Packet Engines' offering, which will ship in June, is expected initially to be priced between \$1,000 and \$2,000 per port. By way of contrast, most vendors only plan to offer 1G bit/sec Ethernet switches, which will cost about \$3,000 per port.

Some analysts questioned whether the price differential will be enough to entice custom-

ers and SNMP-based management platforms. Packet Engines' offering, which will ship in June, is expected initially to be priced between \$1,000 and \$2,000 per port. By way of contrast, most vendors only plan to offer 1G bit/sec Ethernet switches, which will cost about \$3,000 per port.

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©Packet Engines: (509) 922-9190.

AT&T hikes rates to pass along new pay-phone charge

By David Rohde

Washington, D.C.

AT&T last week raised its inbound toll rates 3% across the board, blaming the rate hike on yet another quirky provision of the Telecommunications Act of 1996.

Analysts fear that the provision — concerning, of all things, pay phones — could lead to a series of rate hikes on 800 services throughout the year.

The telecom law requires long-distance carriers for the first time to compensate pay-phone owners for 800 calls that originate from their telephones. Until recently, callers have been able to march up to public phones and punch in 800 numbers to their heart's content, leaving pay-phone owners with neither coins in the till nor revenue for carrying the call.

But now AT&T and 21 other carriers that carry 800- and 888-number traffic are required to pay the equivalent of 35 cents per call to the owners of the nation's 350,000 independent pay phones.

Why carriers are raising inbound toll rates

When someone dials an 800 number from a pay phone...

The carrier collects on average a toll charge of: **50 cents**

The carrier must pay the pay-phone owner under new FCC rules: **35 cents**

The carrier should have to pay, according to AT&T calculations: **6-11 cents**

SOURCES: AT&T, BASKING RIDGE, N.J., AND FCC, WASHINGTON, D.C.

Starting next month, the compensation scheme will be extended to the 1.8 million pay phones owned by regional Bell operating companies and other local exchange carriers.

AT&T's move also includes a

15-cent increase in its calling card surcharge. As a result, large corporate users of AT&T's Software Defined Network will likely see their costs rise because off-site access to SDN and similar voice-network plans is typically obtained via a calling card or 800 number.

MCI Communications Corp. and Sprint Corp. beat AT&T to the punch, with MCI hiking rates 4.9% and Sprint hiking them 2% in December.

Officials of all three carriers said they have to raise 800 rates not so much because Congress required them to compensate pay-phone owners, but because the Federal Communications Commission made the compensation scheme too generous.

The three carriers, plus a host of others last month, sued the FCC in federal appeals court to overturn the FCC's decision.

"We think it's a logical and reasonable argument to provide some compensation," said Bill Archer, AT&T's marketing vice president for global voice services. "But the amount of compensation doesn't seem fair and reasonable." ■

Directory service spec moves ahead

By Paul McNamara and Christine Burns

Even as the Lightweight Directory Access Protocol struggles for a foothold in corporate networks, eight leading directory-enabled product vendors last week scaled an adjacent mountain they say will make the LDAP climb more rewarding.

Prodded by customer requests and roped into one room by the Network Applications Consortium (NAC), these

usually fierce competitors have agreed to abide by a proposal called the Lightweight Internet Person Schema (LIPS). The baseline list of 37 precisely defined and labeled attributes was hammered out over the past three months.

LIPS will be submitted to the Internet Engineering Task Force's Integrated Directory Services Group for approval as an industry standard.

The IETF is working on a related Internet White Pages Schema of its own, which NAC maintains should be aligned with LIPS.

LIPS will let end users with any LDAP-enabled client, such as an E-mail address book browser or scheduling application, search directories that use a common set of attributes, said Eugene Lee, vice president of marketing for Banyan Systems, Inc. of Westborough, Mass.

Besides Banyan, companies behind LIPS are Netscape Communications Corp., Microsoft Corp., Lotus Development Corp., IBM, Novell, Inc., Zoomit Corp. and WorldTalk Corp. All eight companies approved the final draft.

"It's quite important to get this sorted out early, rather than try and retrofit [upcoming LDAP-enabled products], because then you really get political battles," said David Goodman, director of directory services at Lotus.

Several vendors already are pretty far along in adding LIPS support to their products. For example, Lotus Notes: Document Imaging already supports LDAP

and most of LIPS.

Novell Directory Services (NDS) already complies with most of LIPS, and a new version of NDS, scheduled for release this summer, will "be fully LIPS compliant

out of the box," said Michael Simpson, director of marketing for Novell's Internet Infrastructure Division.

Microsoft's next-generation directory — Active Directory — will be that company's first LDAP-enabled service when it ships with Windows NT 5.0 late this year or early next, said Jeff Price, an NT product manager. It will support LIPS, he said. ■

Standardizing directory schema

The Network Application Consortium's proposed Lightweight Internet Person Schema (LIPS) includes the following attributes, as well as 23 other attributes that fall into the "Personal," "Organizational," "Security" and "Ancillary" categories.

LIPS attribute name	Attribute content
E-mail address	mail
Digital certificate	userCertificate
URL	labeledURL
Full name	cn
Given name	givenName
Last name	sn
Generation qualifier	generationQualifier
Organization	o
City	l
Country	c
Personal title	personalTitle
Initials	initials
Middle name	middleName
Unique identifier	uniqueIdentifier

Oracle 8 heads into broader beta test

By John Cox

Redwood City, Calif.

Oracle Corp. officials last week said an array of new transaction-processing and data-warehousing features will be included in the next release of the company's database.

The object-relational Oracle 8 database, which went into broad beta last week, will act as a networked repository of reusable objects and data that can be managed and accessed from PCs and browsers.

But Oracle executives remained tight-lipped about how Oracle 8 will store and manipulate object data. Kelly Herrell, senior director of marketing for Oracle's server technologies group, would only say the new object-relational features will become available when customers upgrade to the new release.

When it becomes available midyear, Oracle 8 will include new features to handle the expected flood of Internet/Web transactions. Connection pooling and multiplexing will let tens of thousands of users access the database efficiently. Oracle has rewritten an array of internal database processes to use less memory, which Herrell said will improve transactions.

Oracle 8 also will let administrators partition data if one section of the database is offline due to maintenance or an outage. The remaining data will still be accessible.

©Oracle: (415) 506-7000.

What's promised for Oracle 8

- ▶ Object-relational technology
- ▶ Ability to handle more user and higher transaction volumes
- ▶ Partitions for sealing off parts of the database for easier maintenance and higher protection
- ▶ Server-managed, automated backup and recovery
- ▶ Easier data copying to other Oracle servers
- ▶ Built-in Oracle gateways for replicating to and from non-Oracle databases
- ▶ New security management services

CORRECTIONS

The score for Xylan in the Feb. 17 "Server Test Series" was incorrect. The correct score is 8.6.

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Web

Continued from page 1

months through its affiliate PSINet Japan, said John Watson, product marketing manager for PSINet. PSINet rolled out its Unix-based Web hosting services in the U.K. last week and has services slated for availability in Europe by the end of this month.

UUNET Technologies, a subsidiary of WorldCom, Inc., is expected to get into the game next week when it announces it is expanding its Web hosting services to Germany and the U.K.

PSINet's service pricing varies depending on the amount of server space and connection users choose. For example, 10M bytes of server space for a Web site and a T-1 line for content update will cost about \$200 per month in Japan, \$100 in the U.S. and \$75 in Europe, Watson said.

PSINet, like its competitors, has been inking deals with international ISPs and carriers for the past few years to prepare for the predicted tidal wave of overseas interest in the Internet.

UUNET is expected to leverage its international acquisitions to support its entry into the international Web hosting arena. In

November 1995, UUNET acquired Unipalm Pipex, a U.K.-based ISP; a year later, it bought EUNet Deutschland, an ISP based in Germany. UUNET is slated to add Australia, Belgium, Canada, France, Japan, the Netherlands and Taiwan to its list of sites, according to a source close to the company.

"This is a great development, but there are a few things missing," said David Goodtree, an analyst at Forrester Research, Inc. in Cambridge, Mass. None of the ISPs are offering Web server mirroring overseas. If a site is not mirrored, the customer is responsible for sending updates to each server site,

TOP REASONS TO OUTSOURCE WEB SITE HOSTING

1. External labor necessary
2. (tie) Need external knowledge
- Increased security
3. Increased speed to market
4. Better service and support
5. More cost-effective

Based on a survey of 35 large customers
SOURCE: FORRESTER RESEARCH, CAMBRIDGE, MASS.

MORE ON UUNET

For our Q&A with Dave Foster, vice president and general manager of UUNET's Web services business, see page 19.



STAN BAROUH

Goodtree said.

Some users demand mirroring. "There has to be some kind of synchronization where you as the customer knows if someone in Taiwan downloads something off a server there that it's the most updated information," said Ralph Jordan of Wang Software in Billerica, Mass.

BBN Planet is also planning its international invasion. The Cambridge, Mass.-based ISP has an agreement with Equant International Corp. to provide BBN Planet with network services in 40 countries where it has facilities, said John-Francis Mergen, principal engineer and senior architect at BBN Corp., BBN Planet's parent company.

BBN Planet is still working out some logistical issues with its international service, but services will most likely roll out in the second quarter of this year, said a company spokesman. ■

Microsoft ready to ship Exchange 5.0

By Paul McNamara
Redmond, Wash.

Three months after ditching a weaker upgrade at the behest of disappointed customers, Microsoft Corp. next week will ship Exchange Server 5.0, a version that appears to have been fed a healthy dose of Web Wheaties.

Users and analysts say the added support for Internet protocols will be valuable — and is overdue — for established Microsoft shops that rely on Exchange as a messaging backbone. But some observers question whether the software giant has added enough functionality to keep up with the huge installed bases of and recent advancements from groupware leaders Lotus Development Corp. and Novell, Inc.

New in Exchange 5.0 are native support for Post Office Protocol 3, HTTP, HTML, Network News Transport Protocol (NNTP), Lightweight Directory Access Protocol and Secure Sockets Layer. And when the upgrade was first announced, Microsoft trumpeted its Active platform and Active server components that will let Webmasters build communications and collaboration applications for Internet and intranet sites.

Microsoft officials failed to return phone calls about this story.

Exchange remains weak in terms of native workflow and groupware capabilities, said Kevin Lee, a senior LAN engineer at Nike, Inc., in Beaverton, Ore. Nike, which is in the midst of an explosive growth spurt, is looking to buy a messaging/groupware backbone for 15,000 employees.

"If Microsoft could get their act together, we would really like to buy [all Exchange]," Lee said. "We're rolling out NT, we're putting [Windows] 95 on the desktop, we have Microsoft Office as our standard desktop. . . why would we not go with a Microsoft solution?"

Answer: Because they need more groupware muscle, which means, Lee said, they may install about 5,000 Notes seats.

Some analysts do not see functionality as a big failing for Ex-

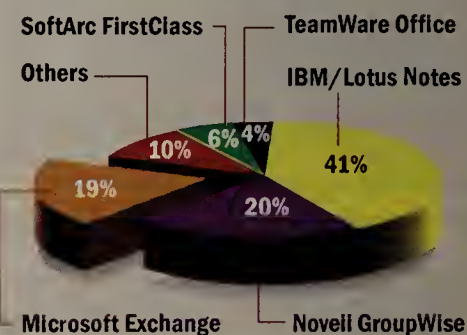
change. "I think groupware can be handled best by third parties," said Rob Enderle of Giga Information Group, a research firm in Santa Clara, Calif. Companies should think twice about marrying their enterprisewide, mission-critical messaging systems to technology as fluid as today's Web-based groupware, he said.

Enderle does't see Exchange 5.0 as a must-buy: "If it was me and I had just stabilized a 4.X [Exchange] deployment, I probably wouldn't mess with it again just to get the 5.0 functionality."

Users and analysts, while generally praising the new version, did complain that scalability issues remain unaddressed. Also, compatibility problems with Microsoft's new Outlook client were called "embarrassing."

Greg Scott, IS manager at Oregon State University's Col-

1996 GROUPWARE MARKET SHARE



Based on a total of 10.5 million new users
SOURCE: IDC, FRAMINGHAM, MASS.

lege of Business, said he has been "very happy" with his Exchange deployment, especially in regard to its Web connectivity.

"There is also high interest in the Exchange NNTP service," Scott added, which will facilitate student and faculty use of news groups via Exchange public folders. "We have been testing this on a limited basis, and today I was told the game plan is to move the entire 12G-byte campus newsfeed to Exchange public folders."

However, not everyone is pinning for 5.0. "It's a nice enhancement, and we're going to be able to do a whole bunch of new things with that capability," said Erik Iversen, director of application development services at Nabisco, Inc., in Parsippany, N.J. "But our [6,500] users haven't been knocking our doors down for it." ■

Netscape

Continued from page 1

iar with the strategy said.

Electronic data interchange and business-to-business applications that can be used between corporations anywhere in the world, over any platform, for performing such functions as checking order status or updating utility usage, will figure into the vision statement, sources said.

"Big companies are going to get a lot of value out of being able to build applications on top of their intranets because with these applications, you can span the firewall and bring your customers and suppliers into the applications that you build," said Netscape spokeswoman Andrea Cook, about the company's enterprise strategy.

Netscape's extranet plan, like its intranet vision, revolves around its Open Network Environment for distributing objects created with Java and JavaScript through the Common Object Request Broker Architecture.

The pieces of that puzzle have been falling into place for several months now, as Netscape has added support for ORBs from Visigenic Software, Inc. in its server and client products. Standards are also in the works to

help objects communicate.

"If you look at, for example, Enterprise Server 3.0, it's not just a Web server anymore. It's an applications server, and a lot of the capability, like the ORB that we built into it, is going to empower applications developers to build object-oriented, dynamic applications and really have tight integration with databases," Cook said. "So that's where we're going with all of the products."

Netscape, which considers itself a platform vendor, has no plans to get into the arena of business-to-business applications, a source said. Rather, the company plans to encourage third parties to develop applications for its platform.

However, Netscape's joint venture with GE Information Services, known as Actra Business Systems, will build electronic commerce applications on top of Netscape ONE.

"For the past several months, Netscape has only been willing to talk about the intranet and has been acting as if the Internet does not exist," said David Marshak, an analyst with the Boston-based Patricia Seybold Group, Inc. when confronted with the information. "Any reemergence of Netscape into the space where

companies are dealing with their customers and partners is very welcome."

In the course of discussing its plans last week with various industry sources, Netscape also started putting some meat onto the bones of its long-term strategy for pushing information to users. The idea would be to let individuals customize their desktops and store the setup on a server for remote access, through a future technology dubbed Constellation.

Netscape has been mulling over several ways of developing personal profiles. Under one scenario discussed, Netscape might store personal profile information in its directory server. Other possibilities include intelligent agents that develop user profiles and more standard personal-agent software that processes preference information.

Firefly Network, Inc., a Cambridge, Mass., company that specializes in the latter, confirmed that it has been talking to Netscape as well as other companies. With Firefly Passport software, users register an alias, a password, zip code, age and gender, and then servers hosting the Firefly software can recognize and use that information to customize the user experience. ■

Microsoft

Continued from page 1

to Explorer can scan the TCP/IP ports and access local files.

The hostile applet could also gain access to a hard drive on the network if the client happens to be running a File Transfer Protocol or telnet server, according to Ben Laurie, director of A.L. Digital. The end result could be altered, destroyed or stolen files, he said.

Network managers should encourage Explorer users within their organization to download, from www.microsoft.com/java/issue.htm, the 1.17M bytes of files intended to mend the security breach in Explorer discovered by security firm A.L. Digital.

Ironically, news of the fix could prompt more problems. "Now that this is being publicized, there's a greater chance of hackers doing this," Laurie said. Exhibiting uncommon Internet restraint, A.L. Digital refrained from announcing its

security hole discovery until Microsoft had a chance to fix it.

The Java security mechanisms developed by Sun Microsystems, Inc., the architect of Java, are supposed to prevent Java applets from gaining access to the local hard disk or other resources on the client machine. Implemented in Java browsers, the Java Security Manager prevents applets loaded across the Internet from opening a network socket to anything other than the server that delivered it.

However, A.L. Digital found a way to outwit the security blocks. Its applet set up a hyperlink with a direct link back into the local cache where the downloaded Java and HTML code are running. If the applet is loaded from the local disk cache, the Java security guard is relaxed, allowing a socket to be opened on the browsing machine.

Laurie said, "It's easy to construct a URL that loads files directly from the local disk cache" because Internet Explorer does not rename the files in its cache. A

Java applet cannot be loaded unless the Java class files are correctly named.

A.L. Digital's cache attack does not work on Netscape Communications Corp.'s Navigator because Netscape makes Navigator rename the Java and HTML pages downloaded to its cache, Laurie said.

However, Netscape Navigator 3.0 and

Netscape Communicator 4.0 did not entirely escape criticism after being put under the security microscope at A.L. Digital.

"It's a much more minor weakness, but you can extract the user host IP name and host name, even if they think they are hiding it behind a firewall," Laurie said. "This is basically a privacy issue." ■

BROWSER SECURITY HOLES

London-based security firm A.L. Digital, Ltd. has identified holes in Java-enabled browsers that can be exploited by means of a malicious applet.

In Netscape Navigator 3.0 and Communicator 4.0:

An attacker can determine the IP address and local host name even if the machine is behind a firewall.

In Microsoft Internet Explorer 3.0 and 3.01:

An attacker can scan all ports on a client machine and any machine on the same intranet, even if the client machine is behind a firewall. The attacker can also open a two-way link with the client machine.

Microsoft has issued a patch for the security hole, available at www.microsoft.com/java/issue.htm. Netscape has not responded to A.L. Digital since being notified of the security vulnerability in January, according to the security firm. However, last week Netscape told *Network World* they do not consider the address visibility a problem.

Microsoft nears browser beta launch

Netscape Communications Corp. leads the competition in getting test versions of its Version 4.0 browser out the door, but arch rival Microsoft Corp. started playing catch-up last week, talking up previously unannounced features that will be part of its Internet Explorer 4.0.

A Platform Preview due this month will incorporate early versions of several new features, including a revamped HTML-based mail client, offline browsing and a Web authoring tool, according to Microsoft product manager Kevin Unangst.

One of the main differentiators in the new Windows 95 and NT versions of Microsoft's browser will be their ability to access anything from Web pages to files on a hard drive through a common interface. Unangst said users will have the option of turning off that feature.

Two major, previously announced new features, Dynamic HTML and Premium Channels, probably will not be ready until closer to summer when the final product is due. Dynamic HTML is used for changing the underlying structure of a Web page on the fly without having to make a round-trip to the server, while Premium Channels will push selected content to users.

Among the new previously unannounced features is a revamped HTML-based Internet mail client called Outlook Express, formerly known as Internet Mail and News. It is positioned to compete with Netscape's Internet standards-based Messenger, which includes support for Internet Message Access Protocol 4 and the Lightweight Directory Access Protocol, sources said.

Other new features include:

- An offline browsing capability that will allow users to select Web pages they would like stored on their hard drives and specify the time to download pages.
- FrontPad, a subset of Microsoft's FrontPage Web authoring/editing tool that will let users access Web Publishing Wizards for easy upload of files to Web servers.
- Smart Favorites, which notifies users that their bookmarked Web pages have changed.

—Carol Sliwa

YOU'RE ONSITE:

You're in one place (the office, the airport, the moon—doesn't matter), but the data you need is in another. Somewhere. On your PC. Or your intranet. Or maybe the Internet.

Thing is, that data isn't a bunch of facts and figures. It's **knowledge**. And it's critical.



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search

firewall directory mail

3Com

Continued from page 1

puts a hurt on [Bay and Cabletron], who will need to do something similar if they want to compete at this LAN/WAN level."

In fact, Bay is trying to bounce

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back from its own mega-merger of Wellfleet Communications, Inc. and SynOptics Communications, Inc., which took place in 1994. Some analysts questioned whether 3Com will run into similar integration problems, but Benhamou said 3Com has learned from Bay's mistakes.

"Bay has provided us a whole list of things not to do in a large merger," he said. "We're not going to change the company name, we're not going to split the job of CEO and chairman, and we're not going to split the board equally in order to avoid a stalemate."

While Wall Street cringed, industry analysts were optimistic about 3Com's ability to pull off a successful acquisition. They said the company's past buyouts have been fairly successful, including its big buyout of Chipcom Corp. for \$775 million in 1995.

Customers looking for one-stop shopping are also optimistic. "We certainly would rather work strategically with one vendor across an array of products than deal with a bunch of individual companies," said 3Com customer Michael Hartness, network services manager at Sun Trust Service Corp., a bank based in Atlanta. "There are lots of big companies, like Cisco, that have a large market share, and I don't think that's stifled any creativity or development."

Deal details

The deal, which the companies hope to complete this summer, will result in a broad product line comprising 3Com's LAN and ATM hubs, switches and network interface cards (NIC), as well as U.S. Robotics' modems and WAN remote access gear.

The combined company will boast market-leading positions in the workgroup switch, NIC, remote access concentrator and PC modem markets.

Considering the size of the companies involved, there is surprisingly little product overlap, analysts said. In fact, 3Com claims just 2% of revenues are derived from overlapping gear.

However, some products will disappear, according to 3Com officials.

3Com's popular LAN-plex, SuperStack, ON-Core and Cellplex LAN and ATM switches will remain strategic products, but similar switching gear from U.S. Robotics' will be phased out.

On the remote access front, 3Com will stick with U.S. Robotics' Total Control product line and phase out 3Com's AccessBuilder 8000 device for the Internet service provider mar-

ket. Benhamou admitted that the AccessBuilder 8000 box, which 3Com acquired from Primary Access Corp., is one generation behind Total Control;

ning to integrate U.S. Robotics' 56K bit/sec X2 modem technology inside the 5000.

The combined company's remote access portfolio should provide 3Com with an edge over Cisco in this product area. Cisco has an OEM relationship with Microcom, Inc. for modems that plug into its AS5200 access server. Cisco also acquired Telebit's digital modem business last summer, though has yet to show anything from it.

Modem madness

Another question of the deal is how 3Com will approach the emerging 56K bit/sec modem market.

Two weeks ago, 3Com endorsed the Rockwell International Corp./Lucent Technologies, Inc. 56K bit/sec modem technology. But with the U.S. Robotics buy, 3Com now will own the competing X2 technology, too.

"The X2 modems are already shipping, so we'll have a better time-to-market with the U.S. Robotics technology," said Janice Roberts, senior vice president of marketing at 3Com. "But our philosophy is to support standards, so I'm sure we'll drive that effort and upgrade [via software] the products as necessary."

Senior Editor Jim Duffy and Senior Writer Tim Greene contributed to this story.

Lucky 13?

3Com has been down the acquisition road a dozen times before.

Company acquired	Deal completed	Acquisition price
AccessWorks	Feb. '95	Undisclosed
Axon Networks	March '96	\$65 million
BICC Data Networks	Jan. '92	\$245 million
Centrum Comm.	Feb. '94	\$36 million
Chipcom	Oct. '95	\$775 million
NiceCom	Oct. '94	\$58.5 million
OnStream Networks	Oct. '96	\$245 million
Pacific Monolithics	Dec. '92	Undisclosed
Primary Access	June '95	\$170 million
Sonix Comm.	May '95	\$70 million
Star-Tek	Jan. '93	\$56 million
Synergetics	Dec. '93	\$104 million
U.S. Robotics	Probably	\$6.6 billion

3Com will help migrate customers to the newer technology.

3Com also offers the AccessBuilder 5000 device — designed for large enterprise customers — which it will keep. 3Com is plan-

3Com's Benhamou breaks down the deal



3Com Corp.'s megamerger with U.S. Robotics Corp. last week raises questions about industry consolidation, competition and product overlap. 3Com Chairman and Chief Executive Officer Eric Benhamou discussed the deal with *Network World* Senior Writer Jodi Cohen.

On what U.S. Robotics brings to the table:

"They are much more than just a modem company. U.S. Robotics offers WAN connectivity, and we are especially interested in their Total Control remote access server platform. They also have ADSL and 56K [bit/sec] modem technology. Also, U.S. Robotics gives us an immediate presence in the carrier market, where they control the largest ISPs like MCI and Sprint. U.S. Robotics also has a strong retail presence. We've never sold NICs retail before, which we'll now have an opportunity to do. Also, our OfficeConnect product line [of hubs,

switches and remote access gear for the small office/home office market] will be perfect for retail channels. As networking becomes more mainstream, retail will become increasingly important"

On the merger's effects on customers:

"Enterprise customers will be the primary beneficiaries of this acquisition. Now they don't have to go to another vendor for remote access products. Also, LAN/WAN integration is key as people start seeing less of a distinction between the LAN and WAN. But not every customer feels a compelling need for an end-to-end solution. Typically, consolidation benefits the larger customers."

On the changing internetwork market landscape:

"We used to be a strong second to Cisco, but there was still a big space separating us. Now there's a big space separating 3Com

and our nearest competitors. So today, there are two large, leading vendors, each with a different set of strengths. We just happen to like our strengths better. In fact, we're not attempting to look like Cisco. We're focusing on growing at the edge of the network."

On avoiding the same pitfalls Bay encountered with its merger of equals:

"We've seen [Bay] blunder an opportunity right in front of us, and we won't fall into the same traps. We will not attempt to create a single, monolithic company out of these organizations. This is a task we are very prepared to face. Actually, this deal has nothing in common with Bay other than the fact that they are both large mergers."

On competing 56K bit/sec modem technologies:

"Now we have a choice. The X2 U.S. Robotics technology is already shipping, and we'll drive it to market as fast as we can. But we'll also help develop a standard, which probably won't be set for another 12 to 18 months. Once the standard is set, we'll upgrade our products via software." ■



IBM

Continued from page 1

"This year, we are focusing on bringing to market the switching infrastructure products users will need to migrate existing networks into the switching world," said Lutz Hahne, general manager of IBM's Networking Hardware Division.

IBM'S SWITCHING BONANZA

Coming soon from IBM:

- ✓ A 12G bit/sec backplane-based 8260 Super Hub
- ✓ A switch capable of handling cell-based traffic at OC-3 to OC-12 speeds
- ✓ Multiprotocol Switched Services 1.1 for setting up "super" VLANs
- ✓ 2216 router/switch improvements to better handle larger switched networks
- ✓ Licensing of IBM ATM Prisma technology to third parties
- ✓ 100Base-T modules for existing switches
- ✓ Management applications for controlling VLANs and switched networks

At the core of next week's campus-based announcements are a new release of IBM's Multiprotocol Switched Services (MSS) software, Version 1.1, and a new 12G bit/sec 8260 Super Hub. MSS controls the routing, bridging, traffic management and congestion control of traffic passing through devices at the edge of switched networks, and is currently implemented in the 8260 hub and 8210 stand-alone MSS server.

Version 1.1 is a major release of code because it will enable users to build big-

ger, more efficient switched nets, claimed Michael Taddei, worldwide manager of IBM's LAN switching products. IBM also will be adding MSS client support to its low-end switch line, including the 8271, 8273 and 8274 Ethernet and Token Ring switches enabling desktop-to-backbone switched services, he said. IBM partner Xylan Corp. is also expected to support the new MSS release in its switches.

MSS 1.1 will support an array of new features from the Private Network-to-Network Interface (PNNI) 1.0 and Next Hop Routing Protocol (NHRP) to ATM Virtual Channel Connection (VCC). PNNI support will enable users to link large ATM nets together as one large net and will enable IBM switches to communicate with other non-IBM switch-based ATM nets. NHRP will enable traffic that needs to be routed through a switched environment to get to its destination faster.

"NHRP gets around having to go through multiple routers," said Kishore Jotwani, IBM ATM campus brand manager.

VCC support is critical because it will, in conjunction with the PNNI support, allow a user on one VLAN to set up a high-speed circuit with another VLAN user, Jotwani said.

At least one beta user said MSS put IBM ahead of where competitors such as Newbridge Networks Corp. are when it comes to building scalable VLANs — but with one caveat.

"What IBM is talking about doing with this VLAN technology is great for migrating flat, bridged token-ring LAN users to big VLANs, but I don't see it having much impact on the collapsed, router-based net-

work user," said Phil Emer, assistant director for network technology development at North Carolina State University.

As for other key components of the announcement, the 8260 Super Hub will contain two IBM Prisma chips that enable the hub to support 56 OC-3 and 14 OC-12 speed links. Today's 8260 has a 4.2G bit/sec backplane and supports 42 OC-3

and 14 622M bit/sec links.

"This box represents a 400% increase in total throughput and will let the 8260 be the core of large, switched nets," Taddei said. Existing 8260 hubs can be upgraded to the new backplane and will support all modules.

IBM executives said all the new products will be delivered this year. ■

IBM to change channel connectivity

Faced with mounting internal and external pressure, IBM officials last week indicated the company may reverse course and license its latest mainframe channel connectivity protocol to other vendors.

Executives also revealed plans to expand the protocol — called MultiPath Channel (MPC) — to work with TCP/IP environments. Currently, MPC works only with IBM's High Performance Routing protocol across SNA nets.

The two MPC-related moves will benefit customers looking for more mainframe connectivity options.

"We are going to start serious discussions on licensing the current MPC technology," said William Duncan, IBM's manager of strategy and business development.

However, IBM has not yet set a timetable for licensing MPC or made any decisions about which parts it would license, said Rick McGee, vice president of strategy and business development for IBM.

"MPC is still evolving, and we are trying to strike the right balance of what will be available publicly without giving away the farm," he said.

MPC currently resides in VTAM and enhances high-volume traffic between mainframes. IBM compares it to a multilane interstate highway on which data can traverse the channel over multiple concurrent data paths.

But because it promises increased throughput and performance with minimal changes to the network infrastructure, IBM views MPC as a strategic weapon to ward off competitors — mostly Cisco Systems, Inc. — from the SNA family jewels.

Cisco, however, has reverse-engineered MPC and will incorporate it in its Channel Interface Processor, which connects its high-end router to the mainframe. Cisco has also said it wants to build a TCP/IP version of MPC in the future.

—Michael Cooney



McGee

STEVE BORNS

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Oracle7 on NT

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WebServer/Database Integration	YES	NO
Cluster Support (Fault Tolerant Parallel Server)	YES	NO
Multiprocessor Scalability	From 1 to 400+ processors	From 1 to 8 processors
Parallel Query, Load, Index	YES	NO
Star Queries	YES	NO
Bitmap Indexes	YES	NO
Integrated Replication	YES	NO
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1

Industry: (check one only)

- | | |
|---|--|
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| 02. ☐ Finance/Banking | 13. ☐ Military |
| 03. ☐ Insurance/Real Estate/Legal | 14. ☐ Aerospace |
| 04. ☐ Health Care Services | 15. ☐ Consultants (Independent) |
| 05. ☐ Hospitality/Entertainment/Recreation | 16. ☐ Carriers/Interconnects |
| 06. ☐ Media/TV/Cable/Radio/Print | 17. ☐ Manufacturers (Computer/Communications) |
| 07. ☐ Retail/Wholesale Trade/Business Services | 18. ☐ Resellers of Computer/Network Products (VARs, VADs) |
| 08. ☐ Transportation | 19. ☐ Systems/Network Integrators |
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| 10. ☐ Education | 21. ☐ Other (please specify) _____ |
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2

What is your job function? (check one only)

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- | | |
|---|--|
| 1. ☐ Networking Management | 5. ☐ Engineering Management |
| 2. ☐ LAN Management | 6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management) |
| 3. ☐ Datacom/Telecom Management | 7. ☐ Consultant (Independent) |
| 4. ☐ IS, IT, MIS, Systems Management | 8. ☐ Other (please specify) _____ |

3

What is the estimated value of networking equipment and services that you help specify, recommend or approve? (check one only)

- | | | |
|--|--|--|
| 01. ☐ \$100 million or more | 05. ☐ \$10 mil. - \$19.9 mil. | 09. ☐ \$250,000 - \$499,999 |
| 02. ☐ \$50 mil. - \$99.9 mil. | 06. ☐ \$5 mil. - \$9.9 mil. | 10. ☐ \$100,000 - \$249,999 |
| 03. ☐ \$25 mil. - \$49.9 mil. | 07. ☐ \$1 mil. - \$4.9 mil. | 11. ☐ None of the above |
| 04. ☐ \$20 mil. - \$24.9 mil. | 08. ☐ \$500,000 - \$999,999 | |

4

What is the total number of sites for which you have purchase influence? (check one only)

- | | | |
|-------------------------------------|-------------------------------------|----------------------------------|
| 1. ☐ 100+ | 4. ☐ 10 - 19 | 7. ☐ None |
| 2. ☐ 50 - 99 | 5. ☐ 2 - 9 | |
| 3. ☐ 20 - 49 | 6. ☐ 1 | |

5

Are you involved in the purchase of and/or plan to purchase network products and services?

☐ Yes ☐ No

6

Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:

B. I plan to purchase the following products/services:

LOCAL-AREA NETWORKS

- | | |
|--|---|
| A | B |
| ☐ 01. ☐ Local-Area Networks | |
| ☐ 02. ☐ Network Op. Sys. Software | |
| ☐ 03. ☐ LAN Storage/Backup | |
| ☐ 04. ☐ Optical LAN Storage/Backup | |
| ☐ 05. ☐ Disk LAN Storage/Backup | |
| ☐ 06. ☐ Tape LAN Storage/Backup | |
| ☐ 07. ☐ RAID LAN Storage/Backup | |
| ☐ 08. ☐ Network Test/Diagnostic Tools | |
| ☐ 09. ☐ Cables, Connectors, Baluns | |
| ☐ 10. ☐ UPS | |
| ☐ 11. ☐ Network Interface Cards | |
| ☐ 12. ☐ Peer-to-Peer LANs | |
| ☐ 13. ☐ SNMP Network Management | |
| ☐ 14. ☐ ATM Switches | |
| ☐ 15. ☐ Token-Ring Switches | |
| ☐ 16. ☐ Ethernet Switches | |
| ☐ 17. ☐ Remote LAN Access/Communications Servers | |
| ☐ 18. ☐ Superservers | |
| ☐ 19. ☐ File/Application Servers | |
| ☐ 20. ☐ Print Servers/Fax Servers | |
| ☐ 21. ☐ CD-ROM Servers | |
| ☐ 22. ☐ LAN Servers | |

INTERNETWORKING

A B

- | | |
|--|--|
| ☐ 23. ☐ Bridges | |
| ☐ 24. ☐ Routers | |
| ☐ 25. ☐ Bridge/Router | |
| ☐ 26. ☐ Gateways | |
| ☐ 27. ☐ Intelligent Hubs | |
| ☐ 28. ☐ Stackable Hubs | |

COMPUTERS/PERIPHERALS

- | | |
|---|---|
| A | B |
| ☐ 29. ☐ Laptops/Notebooks/Sub-Notebooks | |
| ☐ 30. ☐ Micros/PCs | |
| ☐ 31. ☐ Minis | |
| ☐ 32. ☐ Mainframes | |
| ☐ 33. ☐ Workstations | |
| ☐ 34. ☐ Terminals | |
| ☐ 35. ☐ Printers/Network Printers | |
| ☐ 36. ☐ Cluster Controllers | |
| ☐ 37. ☐ CD-ROM | |
| ☐ 38. ☐ Fax/Modem Boards | |

REMOTE/WIRELESS COMPUTING

- | | |
|---|---|
| A | B |
| ☐ 39. ☐ PDAs | |
| ☐ 40. ☐ PCMCIA Devices | |
| ☐ 41. ☐ Wireless Data Services | |
| ☐ 42. ☐ Wireless Data Equipment | |
| ☐ 43. ☐ Wireless LANs | |
| ☐ 44. ☐ Cellular Equipment & Services | |

INTERNET/INTRANET

- | | |
|---|---|
| A | B |
| ☐ 45. ☐ Internet Access Service | |
| ☐ 46. ☐ Firewalls/Security | |
| ☐ 47. ☐ Web Servers | |

INTERNET/INTRANET (cont'd)

- | | |
|---|---|
| A | B |
| ☐ 48. ☐ Web Browsers | |
| ☐ 49. ☐ Intranet Applications/Groupware | |
| ☐ 50. ☐ Search Retrieval Products (web crawler) | |
| ☐ 51. ☐ Internet Development Tools | |
| ☐ 52. ☐ Internet Commerce Tools | |

SOFTWARE/APPLICATIONS

- | | |
|--|---|
| A | B |
| ☐ 53. ☐ Network Management | |
| ☐ 54. ☐ Systems Management | |
| ☐ 55. ☐ Security | |
| ☐ 56. ☐ Communications Software | |
| ☐ 57. ☐ Terminal Emulation | |
| ☐ 58. ☐ Word Processing | |
| ☐ 59. ☐ Operating Systems | |
| ☐ 60. ☐ Client/Server Applications Development | |
| ☐ 61. ☐ Database Management/RDBMS | |
| ☐ 62. ☐ Spreadsheet | |
| ☐ 63. ☐ Groupware | |
| ☐ 64. ☐ EDI | |
| ☐ 65. ☐ E-mail | |
| ☐ 66. ☐ Windows/Graphical User Interface | |
| ☐ 67. ☐ Multimedia | |
| ☐ 68. ☐ Graphics/DTP | |
| ☐ 69. ☐ Remote Access | |
| ☐ 70. ☐ Imaging | |
| ☐ 71. ☐ Server Suites (Back office, etc.) | |
| ☐ 72. ☐ Suites | |
| ☐ 73. ☐ Middleware | |
| ☐ 74. ☐ Document Management | |
| ☐ 75. ☐ Database Server | |
| ☐ 76. ☐ Site Metering Tools | |
| ☐ 77. ☐ Computer-Integrated Telephony (CIT) | |

WIDE-AREA NETWORK EQUIPMENT & SERVICES

- | | |
|--|---|
| A | B |
| ☐ 78. ☐ Frame Relay Equip./Services | |
| ☐ 79. ☐ Modems | |
| ☐ 80. ☐ FT-1/T-1/T-3 Multiplexers | |
| ☐ 81. ☐ FT-1/T-1/T-3 Services | |
| ☐ 82. ☐ SONET | |
| ☐ 83. ☐ Inverse Multiplexers | |
| ☐ 84. ☐ SMDS | |
| ☐ 85. ☐ Asynchronous Transfer Mode | |
| ☐ 86. ☐ Diagnostic/Test Equipment | |
| ☐ 87. ☐ DSU/CSU | |
| ☐ 88. ☐ VSAT/Satellite | |
| ☐ 89. ☐ ISDN Equipment & Services | |
| ☐ 90. ☐ PBXs | |
| ☐ 91. ☐ Voice Mail/Response | |
| ☐ 92. ☐ Videoconferencing | |
| ☐ 93. ☐ Leased Lines | |
| ☐ 94. ☐ Switched Data | |
| ☐ 95. ☐ E-mail | |
| ☐ 96. ☐ 800/900/MTS Services | |
| ☐ 97. ☐ Virtual Networks | |
| ☐ 98. ☐ Outsourcing/Systems Integration Services | |
| ☐ 99. ☐ Education/Training Services | |

☐ 107 ☐ None of the above (1-99)

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7

Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:

B. The following network platforms are planned for purchase:

NETWORK PROTOCOLS

- | | |
|--|---|
| A | B |
| ☐ 01. ☐ SNA | |
| ☐ 02. ☐ DECnet | |
| ☐ 03. ☐ TCP/IP | |
| ☐ 04. ☐ Novell IPX/SPX | |
| ☐ 05. ☐ APPC/APFN/LU 6.2 | |
| ☐ 06. ☐ NETBIOS | |
| ☐ 07. ☐ AppleTalk | |
| ☐ 08. ☐ NFS | |
| ☐ 09. ☐ IPv6 | |
| ☐ 10. ☐ SNMP/SNMPv2 | |
| ☐ 11. ☐ Other (please specify) _____ | |

NETWORK OPERATING SYSTEM

- | | |
|--|---|
| A | B |
| ☐ 12. ☐ Microsoft (LAN Manager) | |
| ☐ 13. ☐ Novell (NetWare 2.X, 3.X) | |
| ☐ 14. ☐ Novell (NetWare 4.X) | |
| ☐ 15. ☐ Windows NT | |
| ☐ 16. ☐ Windows NT/Advanced Server | |
| ☐ 17. ☐ LocalTalk (AppleTalk) | |
| ☐ 18. ☐ Banyan (VINES) | |
| ☐ 19. ☐ IBM (LAN Server) | |
| ☐ 20. ☐ IBM (PC LAN Program) | |
| ☐ 21. ☐ Artisoft (LANtastic) | |
| ☐ 22. ☐ Digital (Pathworks) | |
| ☐ 23. ☐ Other (please specify) _____ | |

LAN ENVIRONMENT

- | | |
|--|---|
| A | B |
| ☐ 24. ☐ 4M Token Ring | |
| ☐ 25. ☐ 16M Token Ring | |
| ☐ 26. ☐ Ethernet | |
| ☐ 27. ☐ Fast Ethernet | |
| ☐ 28. ☐ 100vg Any LAN | |
| ☐ 29. ☐ FDDI | |
| ☐ 30. ☐ LocalTalk | |
| ☐ 31. ☐ 10Base-T | |
| ☐ 32. ☐ ATM | |
| ☐ 33. ☐ Other (please specify) _____ | |

COMPUTER OPERATING SYSTEM

- | | |
|--|---|
| A | B |
| ☐ 34. ☐ DOS | |
| ☐ 35. ☐ Unix/Xenix/AIX | |
| ☐ 36. ☐ OS/2 | |
| ☐ 37. ☐ OS/2 Warp | |
| ☐ 38. ☐ IBM MVS | |
| ☐ 39. ☐ IBM VM | |
| ☐ 40. ☐ Digital VMS | |
| ☐ 41. ☐ Macintosh | |
| ☐ 42. ☐ Windows | |
| ☐ 43. ☐ Windows 95 | |
| ☐ 44. ☐ NT | |
| ☐ 45. ☐ Solaris | |
| ☐ 46. ☐ Other (please specify) _____ | |
| ☐ 47. ☐ None of the above (1-46) | |

8

What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE

- (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

9

What is the total number of LANs, workstations/nodes at this location/in your organization?

At this location:

- | LANs | Workstations/
Nodes |
|---|--------------------------|
| 1. ☐ 5,000+ | ☐ |
| 2. ☐ 1,000 - 4,999 | ☐ |
| 3. ☐ 100 - 999 | ☐ |
| 4. ☐ 50 - 99 | ☐ |
| 5. ☐ 10 - 49 | ☐ |
| 6. ☐ 1 - 9 | ☐ |

Entire organization:

- | LANs | Workstations/
Nodes |
|---|--------------------------|
| 1. ☐ 5,000+ | ☐ |
| 2. ☐ 1,000 - 4,999 | ☐ |
| 3. ☐ 100 - 999 | ☐ |
| 4. ☐ 50 - 99 | ☐ |
| 5. ☐ 10 - 49 | ☐ |
| 6. ☐ 1 - 9 | ☐ |

10

Please indicate your involvement in developing/implementing Internet/Intranet Technologies: (check all that apply)

- | | | |
|--|---------------------------------------|--------------------------------------|
| 1. ☐ Recommend/Specify | 2. ☐ Approve | 3. ☐ Evaluate |
| 4. ☐ Determine the need | 5. ☐ Implement | 6. ☐ None |

11

Which of the following hardware platforms are installed/planned in your company? (check all that apply)

- | | Mainframes | | Minis | |
|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | A - Installed | B - Planned | C - Installed | D - Planned |
| 1. IBM | ☐ | ☐ | ☐ | ☐ |
| 2. Amdahl | ☐ | ☐ | ☐ | ☐ |
| 3. Cray | ☐ | ☐ | ☐ | ☐ |
| 4. Hitachi | ☐ | ☐ | ☐ | ☐ |
| 5. Unisys | ☐ | ☐ | ☐ | ☐ |
| 6. Data General | ☐ | ☐ | ☐ | ☐ |

What is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)

- | E-AT THIS LOCATION | # | F-% with Internet Access |
|--------------------|----------------------|--------------------------|
| 1. Servers | <input type="text"/> | <input type="text"/> % |
| 2. Clients | <input type="text"/> | <input type="text"/> % |

- | G-ENTIRE ORGANIZATION | # | H-% with Internet Access |
|-----------------------|----------------------|--------------------------|
| 1. Servers | <input type="text"/> | <input type="text"/> % |
| 2. Clients | <input type="text"/> | <input type="text"/> % |

Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)

- | | At this location: | | Entire organization: | |
|---------------|--------------------------|-----------------------------|--------------------------|--------------------------|
| | I-Servers | J-Clients | K-Servers | L-Clients |
| 01. Power PC | ☐ | ☐ | ☐ | ☐ |
| 02. Power Mac | ☐ | ☐ | ☐ | ☐ |
| 03. Mac Other | ☐ | ☐ </ | | |

1. FOLD HERE & MAIL TODAY



3. PLEASE TAPE HERE



2. FOLD HERE & MAIL TODAY



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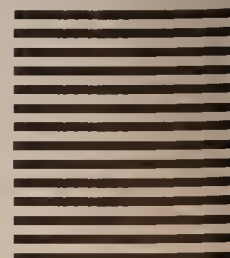
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Briefs

■ **ImageNet, Inc.** unveiled a new version of its **network design** tools that is intended to help users more easily manipulate and enhance their designs.

CANE Version 2 features an autodiscovery module, which automatically locates devices, helps users build and maintain an accurate database of the network, and verifies that designs are correctly implemented. CANE Version 2 also simplifies the planning and maintenance of IP addresses, and supports Windows 95.

CANE Version 2 costs \$7,950 and will be available in the second quarter.

ImageNet: (408) 863-7260.

■ **DecisionOne Corp.** has rolled out a suite of network management services that is designed to help users **control costs** and improve the performance and availability of networked systems.

NetworkOne addresses fault, performance, configuration, security, accounting and operations management. Networks are monitored from DecisionOne's network center in Frazer, Pa., and a backup site in Tulsa, Okla.

NetworkOne is priced on an individual contract basis and is available now.

DecisionOne: (610) 296-6000.

■ **MediaCom Corp.** has taken the penny-pinching **automatic route selection** features of high-end PBXs and brought them down to the level of the PC in the form of its **PhoneMiser** software.



Each outgoing call is checked against the PhoneMiser database to determine which long-distance carrier has the least expensive rate for that particular toll call.

PhoneMiser will be available by May.

MediaCom: (617) 276-8400.

Bay enters IP switching fray

Company says Switch Node forwards IP, IPX at wire speeds with low latency.

By Jim Duffy
Santa Clara, Calif.

Bay Networks, Inc. last week unveiled a routing switch that the company claims forwards IP and IPX data at wire speeds with low latency.

Targeted at campus backbones, Switch Node is designed to handle intranet and inter-subnet traffic that is usually destined for routers and, thus, subject to router bottlenecks. Switch Node is intended to replace or front-end routers as the anchor of campus backbones, moving them instead to the edge of the network to handle firewalling and WAN access.

Switch Node is a five-slot chassis with dual 1.2G bit/sec buses (NW, Feb. 17, page 6). The chassis holds four 10M bit/sec and 100M bit/sec LAN switching modules, while the fifth slot holds a Motorola, Inc. 68060 switch controller card.

One of the buses shuttles packets between the four LAN switching modules, while the other feeds the controller with route computation information. Each switching module implements a MIPS R5000 RISC processor with an address cache and forwarding Application Specific Integrated Circuits for fast route lookup and forwarding.

This helps provide wire-speed throughput and a Layer 2-type latency of less than 50 microseconds, Bay claims, because Layer 3 packets do not first have to go to the controller before exiting a switch port.

Switch Node software is based on Bay's BayRS routing code. The software features a capability called IP AutoLearn that enables the switch to build its IP forwarding address table for locally attached subnets without having to run a routing protocol. Instead, Switch Node

LAYER 3 LEDGER

The skinny on Bay's Switch Node

- Delivers low latency, wire-speed transmission of Layer 2 and Layer 3 traffic
- Enables integration with existing router networks via IP AutoLearn capability
- Supports emerging video and real-time applications
- Features a fivefold performance increase over routers at half the cost
- Based on BayRS routing software

IBM spreads SNA access pack

By Michael Cooney
Raleigh, N.C.

IBM has announced that its Host-on-Demand software, a free, Java-based package that lets traditional 3270 users gain access to mainframe-based SNA applications over the Internet, will now ship with Netscape Communications Corp.'s Communicator Professional software, Lotus Notes packages and IBM's Communications Server for MVS package.

The key to Host-on-Demand is that users do not need to deploy 3270 emulation packages on all client machines in large enterprises. Netscape browser, Notes and MVS server users now have quick and easy access to SNA resources, said William Duncan, IBM manager of business development and strategy.

"It is an economical solution for those users who would have never had a need for SNA emulation packages, rather than a wholesale replacement product for users with existing 3270 access," Duncan said.

Host-on-Demand works when a user on any Java-enabled browser clicks on an SNA application hyperlink. The package then downloads a tn3270 emulator to the browser. Once the browser window is closed, the

emulator goes away. IBM Communication Servers control the Host-on-Demand product, and any changes or updates are made on the server.

IBM's seven-member Software Server family includes a series of modular application packages that can run on a variety of operating systems, such as OS/2 and AIX; soon it will run on Windows NT and Windows 95. At the low end, the Software Servers are intended to simplify what has been a mixed bag of products. The servers also give IBM a competitive product to battle Microsoft's BackOffice suite.

Communications Server for MVS is the largest member of the family, and it includes VTAM Version 4.3, TCP/IP for MVS Version 3.2, OpenEdition for MVS and AnyNet/MVS. VTAM controls the flow of communications to the mainframe, while TCP/IP for MVS links IP networks to the mainframe.

"Users who are deploying their mainframes as Web servers

can combine the two packages to provide complete access to legacy and TCP/IP applications over the Internet or corporate intranets," Duncan said.

Users at Bus-Tech, Inc. who have been beta-testing Host-on-Demand are using the product to access SNA hosts from far-flung remote sites.

"We've tested something like 15 browser types and everything works well," said Joe Makoid, vice president of sales and marketing at the company.

Bus-Tech sells mainframe channel-attached communications devices.

"The key for us during our testing has been not having to deploy browsers to all of our users, which saves time, money and administration," he said.

Host-on-Demand is available for download at www.ibm.com. Current versions are available for IBM Communications Server for OS/2 and AIX, Lotus Notes and Netscape, as well as NetWare for SAA. The Communications Server for Windows NT and OS/390 will be available by mid-year.

©IBM: (800) 426-2255.

"It is an economical solution for those users who would have never had a need for SNA emulation packages, rather than a wholesale replacement product for users with existing 3270 access," Duncan said.

"snoops" Address Resolution Protocol requests and replies.

IP AutoLearn allows users to front-end existing routers with Switch Node without having to reconfigure routers or end-stations, or change network layer addressing, Baysaid.

For IPX data, the switch uses the Routing Information Protocol to build its forwarding table. Bay, however, is evaluating a Service Advertisement Protocol "snooping" capability for building this table, said Gary Southwell, Bay director of technical support.

Bay is the latest entrant in the Layer 3 switch field. Recent players include Digital Equipment Corp., Madge Networks, Inc., RND Networks, Inc. and Toshiba Corp. Cisco Systems, Inc. is expected to add Layer 3 to its Catalyst 5000 in August, and 3Com Corp. will ship its FastIP product later this year.

The switch will ship in May and cost \$2,495 for the chassis, \$5,490 for the CPU, and between \$6,495 and \$7,495 for the switching module. The modules include 16-port 10Base-T, eight-port 10Base-FL and two-port 100Base-TX. Bay plans to add three-port 100Base-FX and 16-port 10/100Base-T modules in the third quarter.

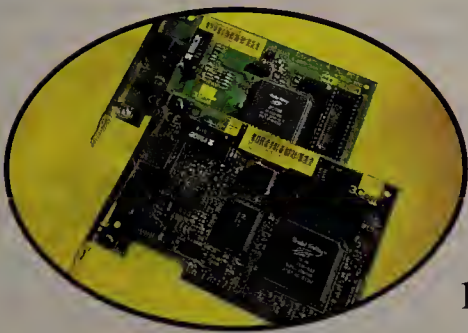
Bay expects to come out with a Switch Node chassis with at least eight slots, Southwell said. Also in the pipeline are higher density 100Base-TX/FX cards, Gigabit Ethernet, OC-3 ATM and FDDI modules for the Switch Node, Southwell said.

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INTERNETWORKING MONITOR

Gigabit ruminations

Like anyone in this business with a pulse, I cannot help but notice the "arrival" of Gigabit Ethernet. Not in recent memory can I recall such a multi-

faceted push for a specific technology.

Although the press treats Gigabit Ethernet as if it were a networking fait accompli, no product has been actually

delivered and there are many questions to ponder.

Here are a few:

The products slated for shipment in the next few months are described using the genteel euphemism "prestandard." While the term has yet to make it into the dictionary, we know that its synonyms are "proprietary" and "nonstandard."

Not that I don't believe the Gigabit Ethernet vendors want to be standard. They do. It just takes time. A lot of time. A visit to the Gigabit Ethernet Alliance Web site shows that the first IEEE meeting on the topic took place in January. In the press, various Gigabit Ethernet proponents have stated that they expect the draft to become final in early 1998!

Now imagine if when Boeing began to spec out the 777, various vendors were anticipating the final design spec. They built components they claimed would be "close" to what the final spec required and promised. Would you want to fly on a "prestandard" 777? You could have my seat. So will any prudent net manager consider implementing Gigabit Ethernet before mid-1998?

Assuming the availability of products that deliver on vendors' claims, one wonders what the demand will be. I believe there is incontrovertible evidence of the benefits of implementing switched 10M bit/sec to the desktop and 100M bit/sec to servers. But is there an imminent need for another ten-fold increase? I think not.

Kevin Tolly

Vague intimations of "bandwidth-intensive multimedia applications" aside, the research we've conducted shows that the applications used most frequently today produce a relative trickle of network traffic.

Of course, this traffic does aggregate. Fortunately, Fast Ethernet interfaces on the servers quickly clear up traffic jams. Furthermore, few servers, if any, can drive even a 100M bit/sec LAN at or near full capacity without consuming nearly all of the server CPU. More likely, bottlenecks in the protocol stack or server application prevent throughput from attaining anywhere near the theoretical limits. This being the case with 100M bit/sec, I can't imagine what actual benefit we'd see in a 1,000M bit/sec attached server.

Thus, it seems Gigabit Ethernet is best suited as a switch-to-switch, fat-pipe technology. But there are other alternatives. As a campus backbone, ATM clearly excels. Work that we've done on myriad products from the likes of 3Com, Cabletron, Bay, Digital and IBM has proven that industry-standard, interoperable high-speed backbone networks are not just a pipe dream (pun intended). And it is becoming simpler all the time.

While Gigabit Ethernet proponents note that OC-3 is much slower than 1,000M bit/sec, the OC-12, 622M bit/sec connections — again running industry-standard LAN Emulation — are becoming generally available. And I'd argue that is plenty fast for most everyone.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.

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At one point the transition path looked clear. It seemed widely accepted that ATM would meet bandwidth demands and serve the local and wide area networks of the future. Now, the advent of fast LAN technologies such as switched Ethernet and token ring LANs, along with 100 Mb and soon, Gigabit Ethernet, challenges conventional wisdom. The picture is made more confusing by the existing FDDI technology and belatedly, cost-effective, standards-based ATM.

Fast LAN Solutions: Technologies and Applications, taught by internetworking expert Scott Bradner, will prepare you to successfully manage these new demands on LAN design. This information-packed one-day seminar will help you evaluate each of the technologies vying to replace existing Ethernet and token ring networks. Mr. Bradner will also guide you through a new maze of decisions by examining the place of virtual LANs and the changing role of routers and routing in the networks of tomorrow. Through information-rich case studies the presenter will highlight real-world fast LAN solutions for you to consider in your own LAN design.

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1997 LOCATIONS AND DATES

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Washington, DC	Mar. 3	San Francisco, CA	Apr. 15
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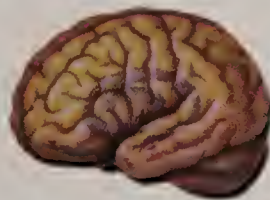
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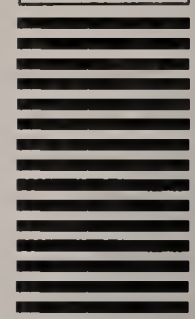
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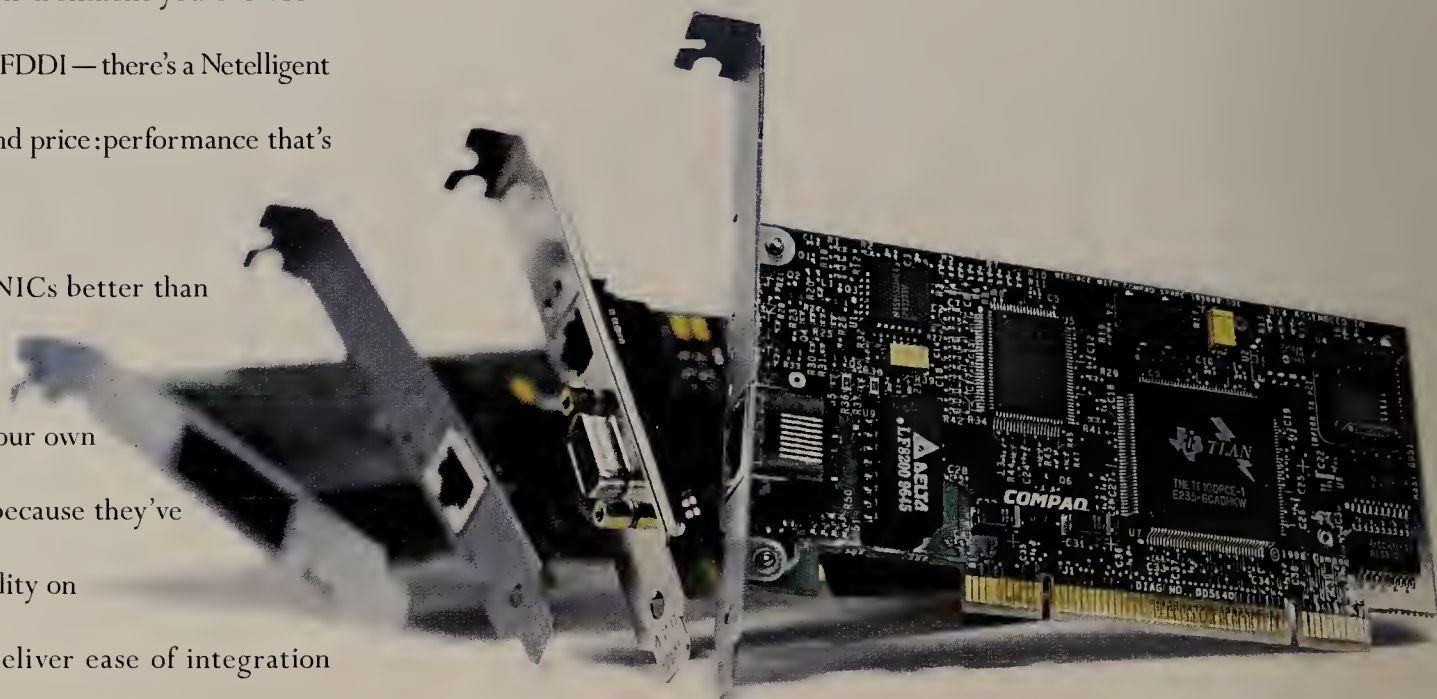
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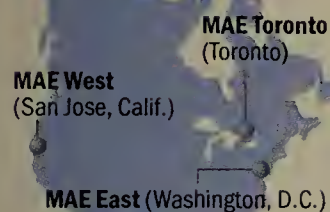
Carrier Services

Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ **WorldCom, Inc.'s** recently acquired competitive local carrier arm flexed its **Internet access** muscle last month with the deployment of its latest network access point (NAP). MAE Toronto is now the third NAP maintained by the former MFS Communications Company, Inc., now a division of WorldCom. MAE Toronto is the first NAP based in Canada. WorldCom also operates MAE East in Washington, D.C. and MAE West in San Jose, Calif.

WORLD.COM'S NETWORK ACCESS POINTS



Initially, the site will offer Internet service providers 10M bit/sec Ethernet access, with plans to increase the bandwidth capacity later this year.

■ **The U.S. Department of Defense** is shunning GTE Corp. — the dominant local carrier in Hawaii — in favor of AT&T for a 10-year contract to provide local service to military locations in Hawaii. AT&T won the contract, worth an estimated \$291 million, by subcontracting local facilities from a subsidiary of Time Warner, Inc. The contract includes switched voice and data, ISDN and leased-line service, with potential for ATM capacity.

■ **Bell Atlantic Network Integration (BANI)** has bundled some of its services into a package that sets up **remote access networks** for between \$1,200 and \$2,000 per site. That price includes designing the net, installing the gear and dealing with carriers to arrange transport lines, including ISDN, frame relay and Switched Multimegabit Data Service. BANI offers its services nationwide. BANI: (800) 742-2264.

Global net promises cheaper messaging, transaction apps

By David Rohde
Englewood, Colo.

A new international service provider is offering to send voice and data messages for half the cost of using public switched connections.

Intergram International, Inc. last month opened its global private network to corporate traffic. Intergram's network initially will carry fax messages; later this year it will transmit E-mail and voice mail.

Intergram's network rides on top of private line and frame relay connections from Equant International Corp., a data network jointly operated by airlines around the world. Intergram has leased capacity from Equant and installed co-located points of presence (POP) at six Equant nodes so far, with more to come this summer (see graphic).

When further expanded, Intergram also will offer a class of

services it dubs "enterprise hosting" for companies that want to offer customers a less expensive way to access information globally, said Michael Cerny, vice president of marketing.

To achieve this, Cerny explained, Intergram has installed Windows NT servers at Intergram POPs linked to the Equant nodes via T-1 or E-1 connections. Because the NT servers are out-

Messaging the world

Intergram's global messaging network currently has nodes or will have nodes by this summer in the following locations:



SOURCE: INTERGRAM, ENGLEWOOD, COLO.

fitted with Dialogic Corp.'s GammaLink voice boards, they can accept input via telephone, fax or the Internet. Target applications include fax on demand, credit card balance checking and financial imaging.

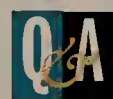
Because the Intergram network is designed for point-to-point, store-and-forward traffic instead of real-time applications, it is not available for live telephone calls. Users will still be responsible for local access to an Intergram POP, although in North America, Intergram will provide toll-free access to its Houston node.

Using a service provider's global private network to carry messaging traffic is expected to grow in popularity as users look for alternatives to the international switched telephone network. A recent global trade agreement aims to force national telephone monopolies into competition, but the resulting price reductions are not expected for some time (NW, Feb. 24, page 1).

"I think it will take time before the promises made come to bear," Cerny said.

©Intergram: (303) 741-5777.

UUNET exec touts outsourcing



Internet service providers want to host your Web, but should you turn over your server? Better bandwidth, security and cost savings are factors indicating you should, according to Dave Foster, vice president and general manager of UUNET Technologies' Web services business. Foster recently sat down with Network World Senior Writer Denise Pappalardo to discuss the advantages of using an outside company to support your Web hosting needs.



don't like the performance. If you are planning to use a Web site as a critical part of your business, then hosting it in an environment that gives it less than its highest possible performance is like printing a brochure on inferior paper with ink that smears.

What do you mean by performance?

Meaning bandwidth. Internet service providers can operate your Web site at a location that is bandwidth-rich. And it is much more important to be in a bandwidth-rich environment than [to have] the server your Web site is on be physically adjacent to your home office.

What are some of the other reasons?

Quality-of-service guarantees.

A single point of failure is what we avoid.

What are the services users can get from you that they cannot get on their own?

It's not so much services, but we offer Web hosting expertise. Corporations that choose to support their Web sites themselves have to worry about staff members keeping up with the technology. Web hosting and related environments are getting more diverse and complex, whereas a year ago, people were only concerned with HTML pages.

Many businesses are concerned that handing over the management of their Web server to an outside company may jeopardize the security of the content. How does UUNET ease these concerns?

When a company does its own Web site management, that server is connected to their main network or one of their networks. We provide an environment where at no point does an

external entity touch your corporate network, because the server isn't co-located with the customer's network.

What are the cost benefits?

It's clearly more economical in most cases to host with a company like us rather than paying the salary of a Web hosting expert, and buying the hardware and software yourself, on top of the recurring monthly costs you would have with an outsourced service. ■

There are more resources online, including:

- Overviews of Web hosting services from other vendors
- Tips for preparing your own server for large numbers of hits

Enter the number above in the DocFinder box on the home page.





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How many remote users do you plan to support?

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☐ 51-100 ☐ 251-500 ☐ 1001+

When do you plan to implement a remote access solution?

- ☐ within 30 days ☐ 4-6 months ☐ 1 + year
☐ 1-3 months ☐ 7-12 months

How many locations do you have in the U.S.?

- ☐ 1-5 ☐ 26-50
☐ 6-25 ☐ 50 +

How many employees in your organization?

- ☐ 1-100 ☐ 251-500 ☐ 1001-5000
☐ 101-250 ☐ 501-1000 ☐ 5000 +

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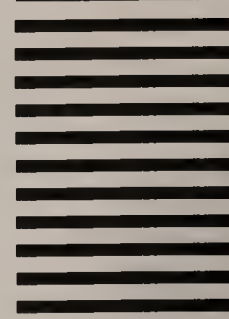
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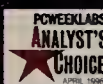
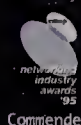
Circle Reader Service #4



October 1996



Network Solutions
1996 Readers' Choice
Winner: Remote Access



Best Remote
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Best ISDN Product



April 1996
LanRover/E Plus



Remote Access
Product of the year



January 1996
Access Switch



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PC World said, "The (IBM) Network Printer 12's \$1250* street price is the lowest on the monochrome chart, and its two-pages-per-minute graphics speed is one of the fastest." (January 1997)

Computer Shopper said, "IBM has come up with a winning combination for medium-size networks... that need reliable, fast printing.... Installation of the Network Printer 17 on our Ethernet network was one of the quickest and easiest we've ever performed." (December 1996)

PC Magazine said, "The IBM Network Color Printer will satisfy the needs of

both business users who need simple color output for reports and presentations and desktop publishers who want nearly photographic-quality output." (October 1996)

IBM Printing Systems Company says, "Call us now at 1 800 358-6661, choose the 'Printer Selection Center' option, and find out more about the network printers lots of people are talking about." If you'd like to read the reviews mentioned here, visit us at www.can.ibm.com/ibmprinters



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Local Networks

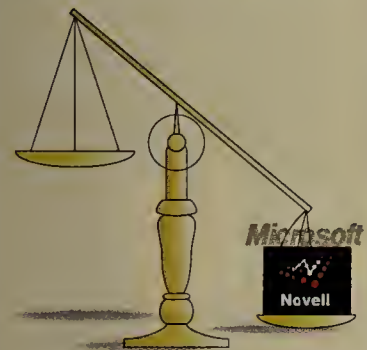
Covering: Servers • Operating systems • LAN management
Hubs • Switches • Adapters and other equipment

Briefs

■ **Banyan Systems, Inc.** has announced it will give customers the option of buying **VINES** and **StreetTalk** for Windows NT products on a per-client basis rather than only on a per-server basis. Under the new scheme, basic server software costs \$1,995, with client-access licenses starting at \$70. For existing users that want to switch from the server-based pricing model, there is a conversion fee of \$1,495 per server.

Banyan: (508) 898-1000.

■ An Arizona court last week ruled against **software piracy**, and in favor of **Microsoft Corp.** and **Novell, Inc.**,



by ordering *The Final Frontier Bulletin Board System (BBS)* to hand over \$73,000 to each of the network software giants. The BBS was found guilty of offering illicit copies of Microsoft and Novell software to its subscribers.

■ The **Cheyenne** division of Computer Associates International, Inc. has announced agreements with **Microsoft Corp.** concerning **disaster recovery and directory management software** for Windows NT. The disaster recovery software, which Cheyenne has offered since September as an option for its ARCserve 6 backup system for Windows NT, will be available as a stand-alone product that runs on Microsoft-compatible backup systems. The software is priced at \$395. Cheyenne also will develop and market a directory services management program for Windows NT.

Cheyenne: (516) 465-4000.

Start-up takes on ATM, router vendors

Foundry sees gigabit gear as the packet-based alternative to ATM in campus networks.

By Jodi Cohen
Sunnyvale, Calif.

It may seem strange to hear an ATM pioneer dismiss the need for ATM in the campus LAN. But that is the message being spread by Bobby Johnson, president and CEO of Gigabit Ethernet start-up Foundry Networks, Inc.

"We want to be the packet-based ATM alternative," said Johnson, who launched Foundry with a bunch of buddies from his last start-up, ATM and token-ring switch vendor Centillion Networks, Inc. "We're providing inexpensive, wire-speed switching and routing, so there's no need for the campus LAN to worry about ATM," he said.

While the emerging Gigabit Ethernet market is rife with switch start-ups, Foundry stands out from the rest in that it will roll out routers, too. In fact, Foundry is taking direct aim at Cisco Systems, Inc. by offering a high-performance, low-cost router to sit alongside — or even replace — slower and more expensive Cisco devices.

First, however, Foundry, formerly known as Star-Ridge Networks, Inc., will roll out its anticipated FastIron family of Gigabit Ethernet switches for LAN workgroups and campus backbones (NW, Feb. 17, page 1).

The company's workgroup switch provides either eight or 16 10M/100M bit/sec Ethernet ports, and two Gigabit Ethernet or two 100M bit/sec fiber-based Ethernet uplinks. The switch, which supports as many as 4,000 media access control addresses, boasts a backplane capacity of 4G bit/sec with a forwarding rate of 2.5M packet/sec.

The company is offering a

Foundry's Gigabit Ethernet gear

All products will be available in May, with the exception of the NetIron Gigabit Switch/Router, which will be available in June.

Product	Pricing
FastIron Gigabit Workgroup Switch	Starts at \$3,995
FastIron Gigabit Backbone Switch	Starts at \$6,995
FastIron Gigabit Multilayer Switch	Starts at \$7,995
Gigabit uplink modules	Start at \$2,495
NetIron Gigabit Switch/Router	Starts at \$9,995

similar Layer 2 device for the LAN backbone — with the same speeds and feeds — but with increased buffering and address table capabilities.

Also for the backbone, Foundry rolled out the FastIron Gigabit MultiLayer Switch, which supports Layer 3 IP switching and can perform — in hardware — most of the forwarding decisions typically done by a router.

In addition, Foundry unveiled plans for its NetIron Gigabit Switch/Router, which offers eight 10M/100M bit/sec Ethernet autosensing ports, and as many as two Gigabit Ethernet or fiber-based Fast Ethernet uplinks. The device — the first of its kind to sport a gigabit uplink — boasts a forwarding rate of 1.5M packet/sec.

Both the FastIron and NetIron products support Foundry's Selectable Quality of Service software features, which offer a prioritization and flow control mechanism, and the IEEE 802.1q virtual LAN tagging scheme for extending VLANs across switches, as well as networkwide QoS through the Resource Reservation Protocol.

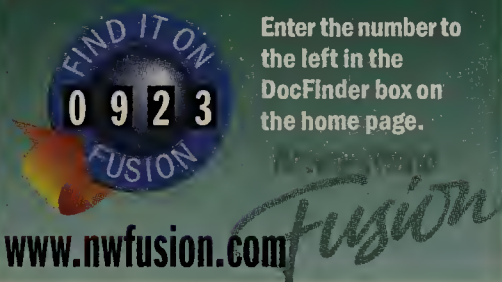
Another key feature is multicast snooping, which reduces multicast traffic by forwarding transmissions only to requesting ports. Also, trunk groups can be formed that allow load sharing across as many as four ports.

All of the products can be managed via Foundry's IronView Enterprise Management SNMP-based application, which sits atop HP OpenView.

© Foundry: (408) 542-0835.

Check out more online.

- A report on a dinner with Foundry Networks CEO Bobby Johnson and executives from other Gigabit Ethernet start-ups
- A library of articles on recent Gigabit Ethernet news
- A technical overview of the technology



LAN switching

Cabletron bids to win wiring closet

By Jodi Cohen
Rochester, N.H.

Cabletron Systems, Inc. wants to win the wiring closet but so far has lacked the equipment needed to compete.

That is, until now. As expected, the company last week unveiled a five-slot chassis — dubbed SmartSwitch 6000 — that supports as many as 120 Ethernet ports and 10 Fast Ethernet uplinks, and is priced at about \$325 per port (NW, Feb. 24, page 12).

That is 24 more Ethernet ports and eight more Fast Ethernet uplinks than Cisco Systems, Inc.'s popular Catalyst 5000. And because both boxes are priced about the same, customers will no doubt compare them when evaluating equipment for tying together workgroups and departments within buildings.

In fact, State Street Boston Corp.'s Tom Stenson currently is deciding between the two switches for his 10,000-node

shared-media network.

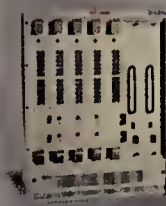
"We're looking to replace all of our closet hubs [Cabletron Multi Media Access Center (MMAC) and UB Network, Inc. AccessOne devices] with switches," said Stenson, the Boston-based bank's vice president of network architecture and planning. "This announcement gives Cabletron a product that can compete seriously with Cisco for that wiring closet business."

While Stenson plans to swap out his MMAC hubs for switches, Cabletron is offering customers who want to stick with their MMACs an Ethernet/Fast Ethernet switch module. The SmartMIM card provides 14 switched Ethernet ports and two Fast Ethernet uplinks, which brings switching capabilities to the installed base of 100,000 mid-range MMAC

hubs. However, Cabletron will point new customers looking for full-blown switching in the wiring closet toward the SmartSwitch 6000.

Cabletron unveils a pair of SmartSwitches

Name: SmartSwitch 2000 and 6000
Function: Ethernet to Fast Ethernet switches for workgroups and wiring closets, respectively
Prices: Stand-alone workgroup switches start at \$6,095, the wiring closet chassis is priced at \$2,995 and Ethernet/Fast Ethernet modules cost \$6,795
Availability: Now



Also, as reported in last week's *Network World*, Cabletron rolled out a stand-alone workgroup switch that combines 24 Ethernet ports with two Fast Ethernet uplinks.

© Cabletron: (603) 332-9400.



Don't count out Novell just yet

There's been much talk of late about the relevance of Novell, Inc. and NetWare/IntranetWare in this increas-

ingly Windows NT-centric network world.

A recent flurry of activity, however, shows that the NT-centricism may be

more a product of Microsoft Corp. press releases than a reflection of reality.

Last week, I mentioned how Microsoft had taken recent sales information from International Data Corp., spun it through its marketing mill, then announced NT was No. 1. Anyone who reads the report, though, can easily tell that Novell maintains its lead in network server installa-

tions, sales of network operating systems and total clients connected for at least the 10th straight year.

Novell irrelevant? Hardly. Novell recently released software for NT workstation clients, including a snap-in for NetWare Administrator called the NT Workstation Manager. With this tool, a NetWare 4.X administrator can control the local Security Access Manager (SAM) database on all connected workstations running Windows NT 3.5 or above.

NT workstations become Novell Directory Services (NDS) objects, which users can be associated with through Novell's NWAdmin tool. Once the user is associated with the NT Workstation object, he is automatically entered into the workstation's local SAM database the first time he logs on to the NDS tree. It's a slick tool, and it works well. It also means you no longer need an NT server with its messy domain structure to control your NT Workstations.

Predictably, Microsoft quickly reacted to spread fear, uncertainty and doubt (FUD) about Novell's product. Among its claims:

- You cannot use NT Workstation Manager and NT Server on the same net.
- Using NT Workstation Manager reduces network security.
- You must upgrade to IntranetWare/NetWare 4.11 to use the Novell offering.

Don't believe it. For Novell's full response, go online to www.novell.com/intranetware/ntint/msfudd.html.

Novell also has just released what amounts to a public beta of a new NDS add-on called Novell Administrator for Windows NT. This software can be used to manage NT servers and domains.



Dave Kearns

Tip of the week

Antivirus product vendor Trend Micro Devices, Inc. has just released Interscan VirusWall for NT 2.0. It adds virus protection for FTP and HTTP sessions to its existing virus protection for E-mail. For details, visit www.antivirus.com.

Later this year, Novell will release a native NT implementation of NDS that will compete directly with Microsoft's Active Directory, which supposedly will come with NT Server 5.0 late this year.

My forecast is for a huge cloud of FUD to be moving out from the Northwest over the course of this year.

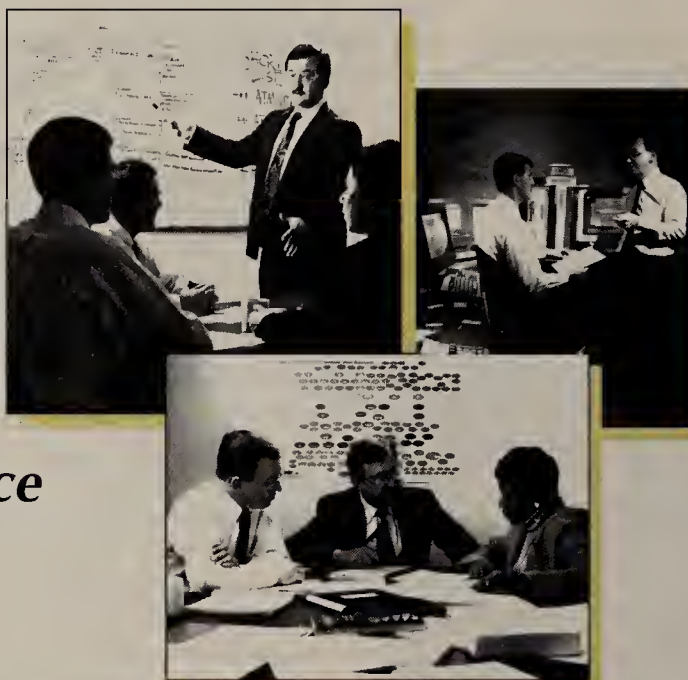
Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

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Circle Reader Service #7

Client/Server Applications

Covering: Databases • Messaging • Groupware
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Briefs

■ **Compression Labs, Inc.** of San Jose, Calif., has announced the immediate availability of a line of **videoconferencing systems** called *Lunar*, which



integrates multipoint conferencing hardware and software with a PC. *Lunar*

adheres to international H.320 and T.120 standards, and comes in four configurations. Prices start at \$13,950 for a 128K bit/sec system.

Compression Labs: (408) 435-3000.

■ **Dataware Technologies, Inc.** of Cambridge, Mass., this week will unveil *NetAnswer 2.0*, an **information management, query and retrieval engine**. The software allows users to make as much as 100G bytes of content available on a corporate intranet or the Internet. Expected to ship this quarter, *NetAnswer* is priced starting at \$10,000.

Dataware Technologies: (617) 621-0820.

■ **Apertus Technologies, Inc.** in Eden Prairie, Minn., has released new versions of its communications servers. *Enterprise/Access* can now automatically generate HTML and other code, and supports Java and IBM's MQSeries messaging middleware.

Enterprise/Connect, which lets Web browsers run mainframe and Application System 400 applications as well as file and print services, now has a Java client. The server software also runs on a wider range of Unix servers. *Enterprise/Access* is typically priced between \$20,000 and \$60,000 per server. *Enterprise/Connect* costs \$895 per server and \$30 per client session.

Apertus: (800) 793-3509.

Internet integration

Centura unites Web and back-end applications

ForeSite Integration Server gives Web browsers access to host and client/server applications.

By John Cox
Menlo Park, Calif.

Building a Web page is easy. Assembling one that can interact with existing mainframe applications is hard, and creating one that can interact with existing client/server applications is harder still.

Enter Centura Software Corp., formerly Gupta Corp. The company's new ForeSite Integration Server is a software package that provides the glue between the Web and existing applications and databases (see graphic). And it is designed to handle heavy or unpredictable Web traffic loads.

"Applying ForeSite to legacy applications — both host and client/server — and converting these to run on the Internet is a straightforward process," said Wayne Kernochan, vice president of commercial systems research at Aberdeen Group, Inc., a Boston-based consultancy.

To apply ForeSite, developers start with ForeSite Integrator, a set of graphical screens used to match up the HTML interface the user's browser sees with Microsoft Corp.'s ActiveX servers, which are programs created by tools such as Powersoft

Corp.'s PowerBuilder or Borland International, Inc.'s Delphi. These matches are stored by ForeSite as templates.

ForeSite also comes with ready-to-use templates, called System Integration Modules, for forging links to various back-end systems, such as host applications, transaction monitors and server-based software objects.

How it works

When the user pushes a button on the browser screen, the request is picked up by ForeSite Dispatcher, which runs on the Web server. Dispatcher determines, via algorithms, which of several ForeSite Page Servers can best process the request. Page Server is a coordination program that activates one or more templates to fulfill the request, and translates the results into HTML documents, which are passed back to the client browser.

Centura designed ForeSite to handle sudden surges in Web traffic. ForeSite does this by running as many copies of Page Server as needed and shifting the traffic load among them, according to Tom Web, director of product marketing at Cen-

tura. Dispatcher and Page Server can run on the same computer or on separate computers.

ForeSite originally was built by InfoSpinner, Inc., a Richardson, Texas, vendor Centura bought in January. The deal will be completed by March 31.

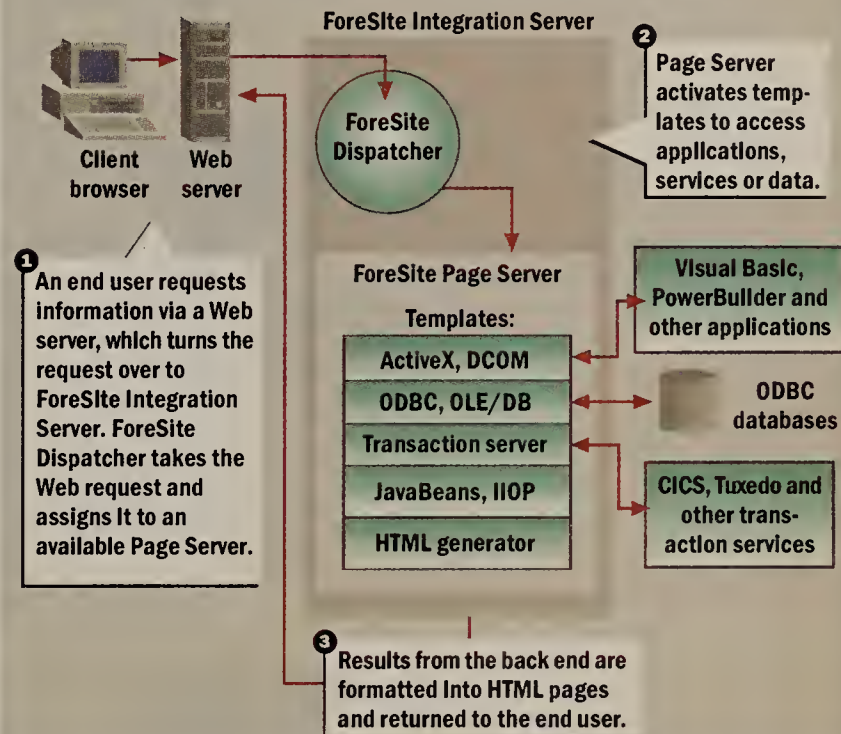
ForeSite is available now, and

is priced at \$5,000 for a starter kit with one Page Server and one Dispatcher. A more complete package, with ActiveX and Open Database Connectivity System Integration Modules, costs \$18,000 on a single-CPU Windows NT server.

© Centura: (415) 321-9500.

CENTURA'S FORESITE

A scalable framework for linking corporate applications to the Web



Integralis E-mail scanner gains Web component

By Paul McNamara
Kirkland, Wash.

As ever more companies are providing Internet access to employees, Integralis, Inc. is adding Web capabilities to its established antivirus/content

scanning software for E-mail.

MIMESweeper 3.0, which will ship this month, includes a new filtering element, called Websweeper, that acts as a proxy Web server to conduct content analysis of data downloaded via HTTP and File Transfer Protocol.

The data is broken down by Websweeper and checked for viruses, macro bombs, Java applets and inappropriate content, such as profane or confidential information. Suspect pages are quarantined at the server and held for closer examination

by a network manager.

According to customers and analysts, the Web addition to MIMESweeper's E-mail protection is a natural and necessary evolution for Integralis as it competes in the security sphere with companies such as McAfee in Santa Clara, Calif., and Trend Micro Devices, Inc. in Cupertino, Calif.

Jim Skamarakas, a senior network engineer at Orlando, Fla.-based Sherikon, Inc., said MIMESweeper provides an important layer of security on the 1,000-seat network his company oversees for the U.S. Army.

"The government has a requirement to provide antivirus

security," Skamarakas said. "And you have a choice: Do you want to find the virus inside the network, or do you want to find it on the outside before it gets in? The MIMESweeper allows you to find it before it gets in the network."

In addition to monitoring for viruses, MIMESweeper 3.0 allows network managers to minimize employee productivity losses by managing junk E-mail, and it places limits on Web access.

Analysts cautioned that customers should not expect MIMESweeper, or any such software, to be a security panacea.

MIMESweeper 3.0 costs \$995 for a 25-user license, with additional 100-user lots priced at \$650 each.

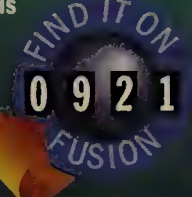
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There's more info online.

- Evaluation copies of server-based antivirus applications
- A look at Word and Excel macro viruses
- An overview of E-mail virus hoaxes

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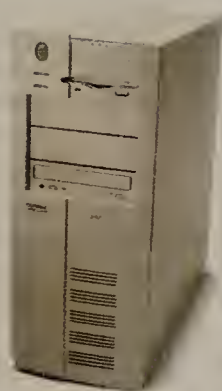
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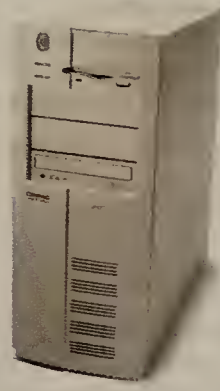
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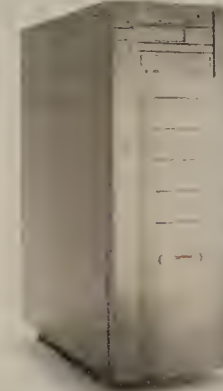
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SHARED LOGIC

More than just an E-mail client

Years ago, the University of Illinois began developing a Post Office Protocol 3 (POP3) E-mail package called Eudora. The shareware program was

used in academic circles but attracted a few commercial customers, including San Diego-based wireless communications product vendor Qualcomm, Inc.

Qualcomm was so impressed with how inexpensively it was able to run the client/server Internet mail package that it created a division to market a commercial version of the software.

Today, there are about 18 million Eudora users. Most use the free Eudora Light shareware version, but about five million of those users paid for

Qualcomm's Eudora Pro.

Qualcomm customers liked the E-mail client from the start but were forced to set up messaging servers on their own, often in the form of a Unix-based public domain package. Increasingly, customers began asking Qualcomm to provide an integrated client and server package.

After all, big vendors such as Lotus Development Corp. and Microsoft Corp. provide such integration and now include POP3 in their product lines, as well. Why buy half a loaf?

Qualcomm initially partnered with Software.com, Inc., planning to use its Post.Office server. However, as my son says after a missed golf shot, "That didn't happen." Early this year, the two companies parted ways, and Qualcomm partnered with Isocor.

Santa Monica, Calif.-based Isocor has provided scalable, standards-based messaging products since the early '90s. Early on, the company's software suite focused on X.400 and electronic data interchange, which proved attractive to many large firms. When Internet messaging became more important than X.400 to Isocor's customers, the company reacted with incredible aplomb, rolling out scalable 'Net messaging offerings with early support for POP3, HTTP and other standards.

The Qualcomm-Isocor partnership addresses joint development, sales, marketing and distribution of Isocor's N-PLEX offering and Qualcomm's Eudora. Through the partnership, Isocor can offer a full client/server solution as its large enterprise and service provider customers begin migrating from proprietary and X.400 solutions to Internet mail.

At the same time, Qualcomm can accelerate Eudora's move out of the small office/home office market into the enterprise messaging market.

Qualcomm sees the small to midsize business market, where the breadth of Notes and Exchange can create undesired complexity, as its best opportunity for now.

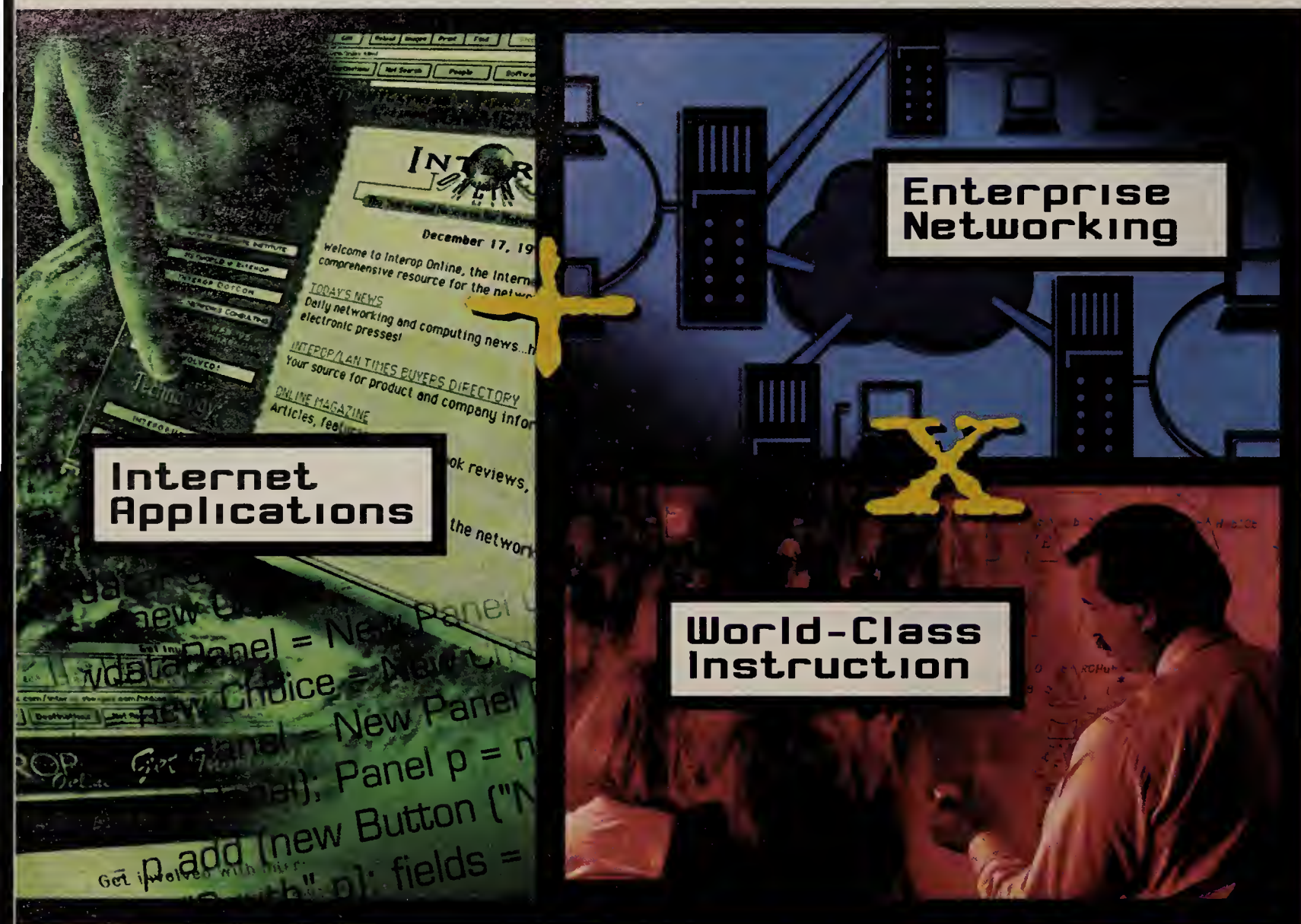
However, Netscape Communications Corp. and Novell, Inc. products are also competitive in this area.

Qualcomm and Isocor have found a potentially profitable niche. The companies may not displace their larger rivals, but they will satisfy a sizable group of customers that want a functional product that doesn't try to bundle in a ton of network operating system or groupware functions.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached via E-mail at dblum@mindspring.com or via the Web at www.rapport.com.



Daniel Blum



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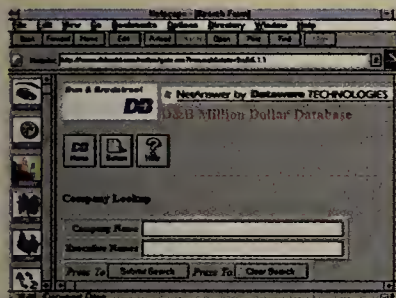
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Briefs

■ **Dataware Technologies, Inc.** this week announced *Net-Answer 2.0*, an **information management, query and retrieval system** that can hold up



to 100G bytes of text and multimedia content, which is made available via the Internet or intranets.

Dataware Technologies: (617) 621-0820.

■ **Open Market, Inc.** has acquired **Folio Corp.**, a subsidiary of Reed Elsevier plc, for \$45 million. Folio's 190 employees will operate as the Folio division of Open Market in Provo, Utah.

■ **SAP AG** has certified its SAP R/3 system to link to the GE Enterprise System 5.1 for exchanging **electronic data interchange** business data with trading partners.

■ **Smart card manufacturers Gemplus and Schlumberger, Ltd.** have formed the **Java Card Forum** to promote the Java Card API as the industry standard for technical exchange of information among **smart cards**. Marc Lassus, chairman and chief executive officer of Gemplus, said he wanted the forum to become the primary channel for making smart card-related recommendations to JavaSoft, Sun Microsystems, Inc.'s unit that stewards the Java programming specification.

■ **Visigenic Software, Inc., IBM and Sun Microsystems, Inc.** have announced that they adopted a common method for identifying **distributed software objects**, so customers will no longer have to write server applications for specific IBM, Visigenic or Sun object request brokers.

IBM Java team spans the globe

Big Blue Java effort just one of many Internet Expo vendor announcements.

By **Ellen Messmer**
San Jose, Calif.

At the recent Internet Expo here, IBM announced it will develop more than half a dozen Java-based business applications and will do so by tapping programming talent across the globe.

Called VisualAge PartPaks, the IBM Java applications for multimedia, training, marketing management and human resources are expected to be ready later this year. The Java code for them will be written by programmers in China, Belarus, India and Latvia, with IBM's Seattle office coordinating the effort via international networks. The result will be around-the-clock coding.

"Some of the top talent in the world is located in those areas," said Scott Hebner, IBM manager of application development marketing. "This 24-hour development initiative gives us the ability to develop components overseas even while we're asleep."

As the sun moves across the globe and programmers in China complete their day's work in Java, they will send the completed code to Seattle, where it will be reviewed and forwarded on to the next shift—perhaps to India and then to the former Soviet republics.

The foreign institutions involved in the IBM effort include Tsinghua University in China, Belarus' Institute of Computer Science, India's Tata Group and an alliance with Latvia's SoftwareHouse Group.

Hebner acknowledged that there would be economies in hiring programmers in the more underdeveloped, low-wage countries.

"True, there's a cost benefit in doing business in these countries," Hebner said. And export issues are not involved in sending code back and forth over the network, he added.

ON with the firewall

Other vendors stepped into the limelight with announcements at Internet Expo:

● **ON Technology Corp.** debuted the second version of its firewall, *On Guard Version 2*, which retains the same stateful-inspection technology of the earlier version but masks some of the firewall's configuration complexity behind simple wizards.

"There are people who have had leased lines to the Internet for less than a year, and sometimes they don't know the basic vocabulary of 'Net services," said Jay Batson, ON Technology's vice president of product strategy.

The firewall wizard lets the

administrator set up all-or-nothing inbound and outbound services for an entire organization easily.

If the firewall administrator



ON Technology's new firewall, *On Guard*

Version 2, was one of the many products unveiled at the show.

wants to set more sophisticated controls unique to each 'Net user, the On Guard firewall can

handle that, too. The product costs \$5,500.

● This week, global Internet Software Group, Inc. will announce its NT-based Century bronze firewall, also Wizard-based, that lets administrators unfamiliar with security procedures easily set up permission or blocking Internet parameters for employees within their organization.

The \$2,995 firewall is integrated with Microsoft NT 4.0 domain names so the firewall administrator sets up security profiles based on information already in the NT domain name system.

● Another firewall vendor unveiled a similar strategy. Raptor Systems, Inc. announced a \$995 stripped-down version of its NT-based firewall that takes a lot of the work out of configuration.

"There are only two screens, instead of five or seven," said Mike Grandinetti, Raptor's vice president of marketing. ■

Corel fits WebMaster with a new 'Suite'

By **Carol Sliwa**
Ottawa

Corel Corp. next week plans to announce its jam-packed WebMaster Suite for creating and managing Websites.

The package, which was released to manufacturing Feb. 17, features two elements,

of file sizes. It also includes wizards to help users create Web sites.

The PhotoPaint image editor/bitmap creator were previously bundled with Corel graphics packages but were not available as part of a Web site creation suite.

"This is the best and most powerful image manipulation application for Web graphics, but previously it was only available bundled with \$600 worth of software you didn't need for the Web," said John Pike, director of cyberstrategy for the Federation of American Scientists in Washington, D.C.

WebMaster Suite also contains the following:

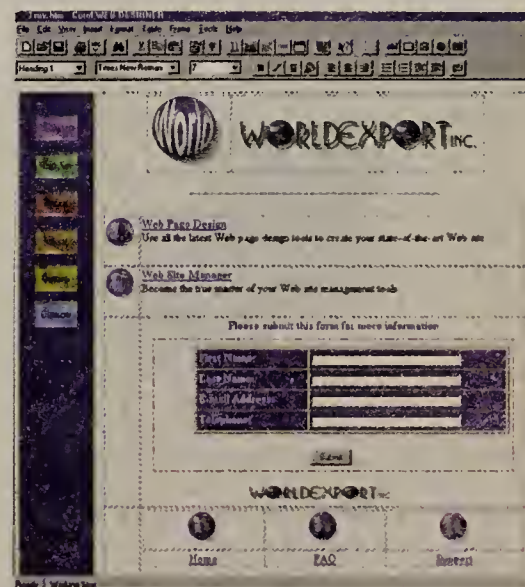
● **Web.Designer**, an authoring tool that lets users without prior knowledge of HTML programming create Web pages.

● **Web.Data**, for publishing database information directly to the Internet.

● **Web.Draw**, for creating and editing illustrations.

● **Web.Move**, for adding animation elements to Web pages.

● **Web.World**, for incorporating



The **Web.Designer** authoring tool is part of Corel's WebMaster Suite.

ing interactive virtual reality.

● **Web.Gallery**, a library of Internet-ready clip art images.

WebMaster Suite runs on Windows 95 and Windows NT. Its suggested price is \$299.

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Web.SiteManager and Web.PhotoPaint, that were not part of the company's Web.Graphics Suite.

The new SiteManager can automatically update links, detect and report broken links, and keep administrators abreast

NET INSIDER

Is this the end of ethics?

The other day, a tantalizing excerpt from an Associated Press item was posted to a mailing list I'm on. It seems an Iraqi government newspaper has de-

clared the Internet "the end of civilizations, cultures, interests and ethics." The computer network "is one of the American means to enter every house in the

world," *al-Jumhuriya* said in an editorial. "They want to become the only source for controlling human beings in the new electronic village."

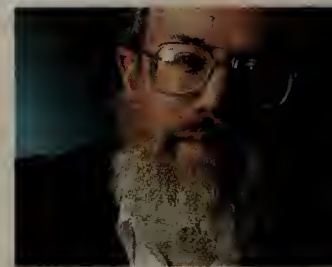
It seems there are two charges here. First, the Internet is going to zap the world as they know it; and second, the U.S. is doing the zapping. It might be easy to dismiss this as the laments of latter-day Ludd-

ites, but the Iraqis have managed to be totally right and totally wrong on the first charge, and they are clearly wrong about the second.

Their use of the words "civilizations" and "cultures" is interesting and accurate. They did not say "countries" or "nations." These words too often refer to artificial constructs with borders established through conflict, negotiation or by the capricious whim of remote powers. Cultures generally respect these types of borders about as well as the Internet does.

The Internet clearly can, and is likely to, have a major destabilizing impact on civilizations and cultures, which are maintained by controlling citizens' access to alternative views or to accurate news of internal events. Some might claim the idea that the strength of a culture is related to its openness to hear the views of others and its ability to deal with those views in its own context is some strange Western idealism. They fear people could get confused. It is that type of thinking that led to the destruction of the library at Alexandria.

The Internet can be a supporter of some cultures just as easily as it can be a threat to others. The low cost of having a presence on the



Scott Bradner

Internet can be used to provide a focus to preserve a culture that might otherwise die due to a small membership or geographic dispersion. Tribal histories that might otherwise be forgotten and tribal languages that might wither from disuse can be kept alive for future generations. Some cultures will be affected more than others, both positively and negatively, by the ability of people to communicate with few restrictions.

The Iraqi editorial is internally self-contradicting. Its authors say the Internet is an American plot to dominate the world, and they imply they are powerless to stop it. But in saying that, the Iraqis gloss over the fact that they, too, can exploit this medium — not as well as governments can exploit television, however, because distribution, other than for direct satellite broadcasts, is locally managed to the extent that governments can dictate what is shown. The many-to-many nature of the Internet makes this type of control much harder. It is an environment where Hezbollah can have a Web page (they do) at the same time the CIA does. If the Internet is an American plot, we are being rather lax about who we let join. And I do not have a clue as to why the Internet means the end of ethics.

Disclaimer: There are many opinions at Harvard about culture, ranging from the biology department to the anthropology department, but the above are mine.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached via the Internet at sob@harvard.edu.

Got Frame Relay Management on Your Mind?

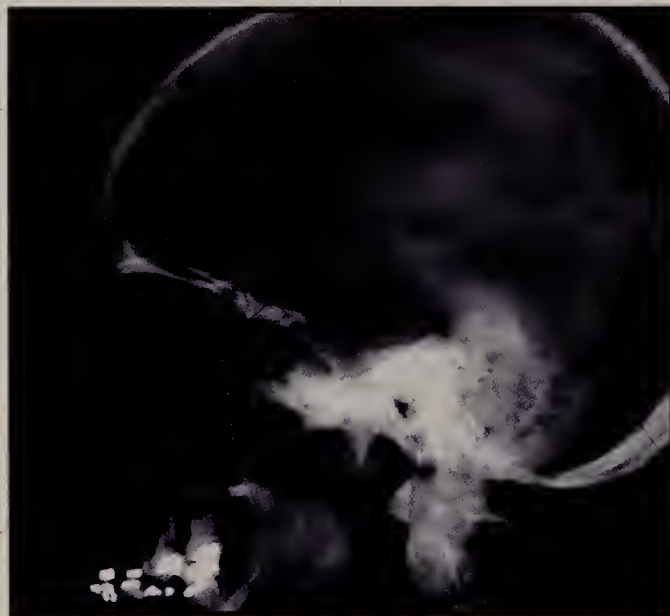
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Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.

I will be installing some switches and hubs in my data closets and will be using Category 5 unshielded twisted pair for 100Base-TX and 10Base-T. I know the maximum length for the cable is 100 meters, but I'm not sure if a minimum length has been specified. I'd like to keep the equipment stack as neat as possible, without long loops of cables hanging down, if that is allowed.

Via the Internet

Everything I have come across specifies 3 feet as the appropriate patch cable length. But check out www.anixter.com/tiabook.html, where you'll find wiring specifications for just about any scenario you could find in the real world.

In addition, ask the technical support folks from your hub and network card vendors for their recommendations.

If you are using 3Com Corp. hubs, you have an alternative to using a patch cable to connect the hubs. 3Com makes a "backbone" cable that links as many as four hubs and makes them appear as one physical hub. This helps keep the wiring to a minimum when interconnecting hubs.

Depending on the interfaces available on the hubs, you may want to consider a fiber-optic connection to help keep the available 100Base-TX ports open for workstation and file server connections.

If you will be connecting the hubs via a crossover cable, be sure to clearly label the cable. If you can, use a different color cable to make the crossover cable stand out from the others.

You also may consider using stranded wire for the patch cables. This type of wiring provides a little more give-and-take than conventional solid-wire cables.

Unless you are comfortable with wiring your own patch cables using the stranded wire, save some time and grief by buying ready-made cables.

Sorting through the VPN protocols

Knowing how these protocols address security, flexibility and interoperability helps net managers pick among them.

By Alex Henthorn

As appealing as the idea of virtual private networking (VPN) is to most network managers, the variety of potential solutions being pitched by various vendors and industry groups has many of them confused.

As discussed in last week's article, VPN provides a relatively inexpensive way to connect telecommuters, mobile workers and remote sites to a home office LAN. Security, flexibility and interoperability are three critical design areas.

When studying the protocols being pitched for VPN, network managers should keep those criteria in mind. VPN protocols are:

- Point-to-Point Tunneling Protocol (PPTP), championed by Microsoft Corp. (this is probably the best known VPN protocol).

- Layer 2 Forwarding (L2F) protocol, developed by Cisco Systems, Inc.

- Layer 2 Tunneling Protocol (L2TP), a combination of the PPTP and L2F offerings that is supported by multiple vendors.

- IP Security (IPSec) protocol under development at the Internet Engineering Task Force (IETF).

Tunneling is an important concept to understand when evaluating VPN protocols. Tunneling refers simply to the practice of encasing one protocol in another protocol. In order to carry IPX across a TCP/IP-only network, for example, the protocol has to be encased in an IP packet.

VPN extends tunneling for security purposes. Specifically, private data packets are secured using data encryption, authentication or integrity functions and are then encased in IP packets for transport across the Internet.

Layer 2 or Layer 3?

Two types of VPN tunneling are being proposed: Layer 2 and Layer 3 tunneling. PPTP, L2TP and L2F fall into the former category and IPSec into the latter.

The goal of Layer 2 tunneling

protocols is to transport Layer 3 protocols such as AppleTalk, IP and IPX across the Internet.

To achieve this, the architects of PPTP and L2F leveraged the existing Layer 2 PPP standard, which is designed to transport different Layer 3 protocols across serial links. In these schemes, Layer 3 packets are

PPTP and L2F are vendor-specific, proprietary protocols, so interoperability is limited to products from supporting vendors.

In contrast, L2TP is a multi-vendor effort, so interoperability is not as much of a problem. It's important to note that when utilizing tunneling protocols

port across the 'Net. Key management functions also will be a part of the IPSec protocols suite.

The IETF has issued five request for comments — RFC 1825 through 1829. An interesting note is that if IPv6 succeeds in replacing IPv4, IPSec will be the automatic Internet VPN standard since it is

KNOW YOUR VPN PROTOCOLS

The following is a rundown of protocols that support the creation of virtual private networks (VPN) across the Internet.

Protocol	Description	Status	Pros	Cons
L2F	Permits tunneling of the link layer of higher level protocols across the Internet	Developed by Cisco and endorsed by Northern Telecom and Shiva; has been submitted to the IETF	▲ Provides the ability to securely transport multiple protocols across the Internet ▲ Functions in LAN-to-LAN and dial-up-to-LAN modes	▼ Currently a proprietary protocol ▼ Doesn't provide for data security
PPTP	A PPP extension that supports secure transport of IP, IPX, NETBIOS and NETBEUI protocols across the Internet	Ascend Communications created the fundamental architecture and advanced the concept to Microsoft, which now champions it	▲ Provides the ability to securely transport multiple protocols across the Internet; functions in LAN-to-LAN and dial-up-to-LAN modes	▼ A proprietary protocol ▼ Doesn't provide for data security
L2TP	Combines the features of the L2F and PPTP protocols; permits tunneling of the link layer of PPP so privately addressed IP, IPX and AppleTalk packets can be carried across the Internet; refers data security to the IP Security (IPSec) protocol	Developed via a multivendor effort	▲ Provides the ability to transport multiple protocols across the Internet ▲ Functions in LAN-to-LAN and dial-up-to-LAN modes ▲ Supported by multiple vendors	▼ Doesn't provide for data security
IPSec	A network layer security protocol that will provide authentication, integrity, access control and confidentiality for sending IP packets across the Internet	IETF is working on the protocol for inclusion in IPv6	▲ Provides the ability to securely transport IP across the Internet ▲ Functions in LAN-to-LAN and dial-up-to-LAN modes ▲ Will be automatic VPN standard with IPv6	▼ Can only carry IP

encased in PPP frames, which are then encased in IP packets for transport across the Internet.

From a security standpoint, Layer 2 tunneling protocols are insufficient to be VPN solutions on their own. None of these protocols provide the data encryption, authentication or integrity functions that are critical to maintaining VPN privacy.

The L2TP specification disclaims any data security functions and refers IP data security to IPSec, but no serious security provisions or references are made for the other Layer 2 protocols. In addition, none of these protocols provide a mechanism for key management, which limits their scalability.

besides IP, users will have to rely on vendor-specific data security features.

On the upside, PPTP, L2F and L2TP can transport multiple protocols. They also function both in LAN-to-LAN and dial-up-to-LAN tunneling modes, allowing them to cover the applications most desired for VPN.

IP only

The goal of the IPSec protocol suite is to provide secure tunneled transport of IP data only. Essentially, it takes private IP packets, performs data security functions such as encryption, authentication and integrity, then wraps these secured packets in other IP packets for trans-

ported into the IPv6 specifications.

Like the Layer 2 VPN protocols, IPSec works as a LAN-to-LAN and dial-up-to-LAN solution. It is designed to support multiple encryption protocols, a feature that allows users to choose a desired amount of data privacy. Obviously, IPSec will only be of value to companies that want to tunnel IP exclusively since it doesn't support other data protocols.

Henthorn is senior technical product manager at Livingston Enterprises, Inc., a remote access vendor in Pleasanton, Calif. He can be reached by phone at (510) 737-2156 or via the Internet at alex@livingston.com.



A cautionary tale for 3Com and U.S. Robotics

How's this for coincidence and irony? Last Wednesday, I chatted with a top Bay Networks executive about the company's new direction under CEO David House. He waxed enthusiastic about House's leadership skills and the revitalization of the dormant company, including Bay's new strategy that will be announced by mid-April.

He freely acknowledged what critics and the stock market have said: Bay hasn't gotten very far since it was formed by the merger of Wellfleet and SynOptics. It has underperformed while the market exploded. "Mergers of equals just don't work," he said, echoing conventional wisdom.

Later, in my nondescript rental car, I was taken aback when the radio announcer reported that 3Com and U.S. Robotics had sealed the data network industry's biggest merger, a \$6.6 billion deal that will put 3Com CEO Eric Benhamou in charge of a melded company with some \$5 billion in sales.

Whether you call it a pooling of interests or an acquisition, make no mistake that this is the merger of two equals. 3Com has \$2.8 billion in sales; U.S. Robotics is close behind with some \$2.2 billion. Both are hard-driving companies with strong cultures and deeply ingrained approaches to the marketplace.

Benhamou has done a masterful job orchestrating a series of

smaller buyouts, where the acquired companies were quickly woven into the 3Com tapestry. But this is something else entirely. Even acquisition-minded Cisco, which gobbled up StrataCom, hasn't swallowed a fish this big.

3Com still has a ways to go in leveraging its last big buyout, 1995's \$775 million purchase of Chipcom, and 3Com's lucrative adapter business is under attack by Intel.

3Com and U.S. Robotics say the merger will give them a complete portfolio for all you one-stop shoppers, and will capitalize on their strengths in different markets and distribution channels. But consider that Bay's marketing materials still cite those advantages as though they had actually been realized through the merger.

In U.S. Robotics' 1996 annual report, CEO Casey Cowell said: "If one thing sets this company apart, it is our ability to set clear goals and to stay focused on reaching them despite all the distractions of a complex and changing market."

Will that still be true of U.S. Robotics? Of 3Com?

Everyone roots for a strong competitor to Cisco, whose dominance over the industry seems to grow every day. But will 3Com become a stronger competitor or a stalled competitor? Mr. Benhamou, have you bitten off more than 3Com can chew?

John Gallant, editor in chief

jgallant@nww.com

High-speed Access • John Walecka

Milestones to watch on the road to DSL deployment

With the rapid integration of voice, data, video and graphics over the Internet, we're poised and ready for new technology that will deliver a true multimedia Internet. Digital Subscriber Line (DSL) has been touted as a prime candidate because of its ability to handle high-speed applications over existing telephone lines.

Here are some milestones to watch out for that will help you gauge DSL's progress and make a more informed call about when to purchase products or services.

- Keep an eye on how the carriers roll out DSL-based services. The thing that typically accelerates the coming of age of new technology is that magic point where price is low enough and performance is high enough to make good business sense. So big technology consumers like the carriers play a major role in spurring the development of better, more affordable solutions. Furthermore, the rate at which carriers adopt DSL in its various flavors will determine how network equipment vendors deliver products that support the technology.

Case in point: US WEST, Inc. recently announced commercial deployment of two kinds of DSL technology: ISDN DSL (IDSL), operating at speeds up to 128K bit/sec, and High-speed DSL (HDSL), operating at speeds up to 704K bit/sec. These new, aggressively priced DSL services will not only compete with existing data services such as 56K bit/sec and dial-up ISDN, they will also spur other carriers to deliver competitive offerings. This will increase the demand for network equipment and lead to lower customer premises equipment prices—a trickle-down benefit to business users.

- The Internet is the key driver of DSL solutions. Consequently, DSL platforms will need to support multimedia traffic with varying quality-of-service levels. While DSL access multiplexers are today's platform of choice, watch for next-generation platforms that support both ATM and IP in a switched environment. This will allow carriers to tailor their services to evolving market needs.

- Keep tabs on Microsoft Corp. Core socket-layer functionality, built into Windows sockets (WinSock), allows IP mapping onto cell-based ATM, making it easier for DSL solutions to provide end-to-end connectivity to the bulk of enterprise desktops. If there is an opportunity to enhance control of the platform at the desktop and throughout the enterprise, Microsoft probably will be one of the first to deliver. Watch for new features built into WinSock and marketed as

"enhanced desktop access" or "intranet enhanced."

- Don't worry about the debate between two competing Asymmetric DSL (ADSL) modulation schemes, Discrete Multi-Tone (DMT) and Carrierless Amplitude/Phase (CAP). Instead, look for which one is available first and in the most affordable products. Availability and price are the watchwords for technology implementation.

- Look for network equipment that interoperates with carrier and customer premises equipment. Vendors such as Amati Communications Corp., Ascend Communications, Inc. and U.S. Robotics have announced products that support DSL traffic between premises and public networks.

- Watch how specific market niches and applications cluster around the different flavors of DSL. For example, ADSL may be tapped for home uses (video on demand) and telecommuting applications. HDSL could be adopted by small businesses and power users, where very high performance (T-1 level) is required, and be used to extend backbones across campus networks. Very high-speed DSL (VDSL) might be the pipe to deliver Internet traffic or limited multimedia traffic to large businesses.

DSL technology has the potential to fulfill much of the promise of the Internet and enhance business models that leverage the power of multimedia networks. And DSL is already making high-speed access more affordable. That equipment investment decision you face just got a little safer.

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Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

E-mail etiquette

Regarding your editorial "What's right and wrong about E-mail" (Feb. 3, page 38):

Since everyone has their own definition of "spam," perhaps the way to control it is to allow each E-mail user to filter his mailbox his own way.

Require that all E-mail have a tag in its header, and enforce the requirement with severe penalties for failure to comply. Tags would include things like "personal," "commercial," "public service" and "not-for-profit." Users would then have the ability to accept or reject each type.

Allowing the spammer to do his thing



Tunneling is key to secure extranets

Extranets are nothing new. Businesses have been establishing secure telecommunications links with customers, suppliers and other trading partners for at least a couple of decades.

Don't get cynical on me, though, and prematurely dismiss extranets as yet another example of trend-happy pundits succumbing to the "I thought of a new way to say the same old thing" syndrome. The term is in fact useful because it highlights a powerful new trend: increased use of the Internet to support secure interorganizational virtual private networks (VPN). This trend reflects the Internet's maturation into a secure production network for business-to-business communications and transactions, and highlights the critical need for strong authentication, encryption and nonrepudiation services on the World-Wide Web.

Security is what makes the extranet. Typically, extranets are implemented as logical overlays—defined only by access privileges and routing tables—on today's intranet and Internet infrastructure, rather than new physical networks in their own right. One corporate Web site, application or database may reside on all three networks—Internet, intranet and extranet—depending on who's accessing it and what security privileges have been applied.

As the transaction volumes on your extranet increase, you'll need such value-added security features as protocol tunneling, public-key certificates and authentication tokens. You may have already acquired these technologies for intranet and remote access applications, thereby reducing the incremental cost of deploying them for extranet applications. Indeed, your company probably has most, if not all, the basic ingredients needed to implement a basic extranet, including legacy applications, Web servers, intranets, proxy servers, firewalls, Internet service providers and Secure Sockets Layer-capable browsers.

Perhaps the most important security technology for extranets is protocol tunneling. Tunneling—network-layer packet encryption and encapsulation—will be key to scalable extranets handling a growing volume of secure transactions between trading partners. Tunneling enables new protocols to be encapsulated and delivered unmodified to a remote intranet firewall that has been set up to handle them, such as when IP Version 6 packets are tunneled over legacy IP Version 4 WANs, facilitating eventual transition to the new protocol. Tunneled packets are decrypted at the receiving end and then routed on the recipient's intranet to their ultimate destinations.

Your current routers and firewalls may already support tunneling. Leading router and firewall vendors now provide the capability in their products, making it

possible for two or more companies to establish secure VPNs over the Internet. One major ISP, UUNET Technologies, Inc., has introduced a commercial extranet service called ExtraLink that uses Cisco Systems, Inc. encrypting routers.

Unfortunately, tunneling standards are still not mature enough to support worry-free, interoperable, end-to-end extranets. Routers and firewall vendors such as Cisco, CheckPoint Systems, Inc. and Trusted Information Systems, Inc. generally support their own proprietary tunneling specifications. Open industry standards have been defined, but none of them has achieved the widespread acceptance necessary for open extranets to flourish. These open tunneling standards include:

- **IPSec:** A network-level authentication, data integrity and encryption feature built in to the emerging IPv6, and defined in RFCs 1826 and 1827.

- **Point-to-Point Tunneling Protocol (PPTP):** An extension to the PPP that was developed by Microsoft Corp. and leading manufacturers of firewalls, routers and remote access servers. PPTP supports tunneling of IP, IPX or NETBEUI protocols inside IP packets. It runs over Microsoft Windows NT 4.0, Microsoft's own Internet/Web products and various third-party Internet communications products.

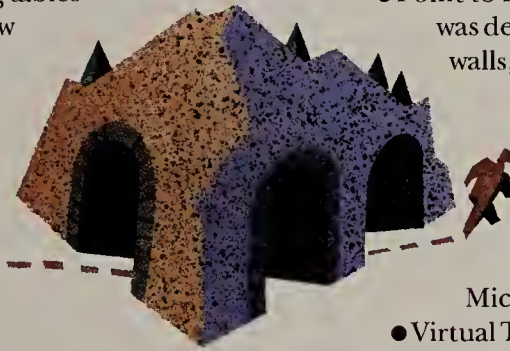
- **Layer 2 Tunneling Protocol:** A proposed Internet standard that combines Cisco's Layer 2 Forwarding technology with Microsoft's PPTP.

- **Virtual Tunneling Protocol:** A proposed Internet standard that would use IPSec as the underlying security mechanism.

Now is a good time to explore the tunneling capabilities of current routers and firewalls, especially to discover whether they encapsulate your backbone intranet protocols such as IPv4, IPX, SNA, NETBIOS and NETBEUI. Determine whether your trading partners have compatible routers and firewalls, and test bilateral interoperability before implementing tunneling on a production extranet.

Also, keep pressuring vendors to support open tunneling standards for Web-based extranets. You should be able to take secure multivendor tunneling interoperability for granted. Today's fast-paced business environment demands the ability to reconfigure business relationships—and the corresponding online interconnections—practically overnight.

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puts no restrictions on free enterprise, but requiring him to identify himself and his motives, and allowing me to block his communications if I choose, allows me to exercise my right to privacy.

Ed Hiller

*Network administrator
Little Rock Wastewater Utility
Arkansas*

In general, I do not resent receiving E-mail from a firm or individual that has taken some effort to seek me out and identify

me as having a vested interest in a particular venture.

What I do resent is someone who treats me merely as an E-mail address to be bought and sold like chattel, and who sends me inappropriate mail without any regard for me as a person.

Eric Ewanco

*Software engineer
Xyplex Networks, Inc.
Littleton, Mass.*

should do the work.

On the negative side, you did not report on the performance of any of the firewalls. How much Internet throughput do we get for our buck? My experience is that proxy firewalls can bog down before stressing the hardware they are running on or with. Will one firewall service my company's needs? Will three? Budget planners need to know.

Good start on an important topic.

*Michael Rasmussen
Network engineer IV
US Bank
Portland, Ore.*

Firewall feedback

As the firewall administrator for my company, I welcomed your firewall Buyer's Guide (Feb. 3, page 41).

Your praise of the alerting feature of Raptor Systems, Inc.'s and AltaVista Internet Software, Inc.'s firewalls was justified. The other vendors' dismissal of this feature's importance was disturbing. They are in the security business, they know what is really important to monitor, and they

The anti-Unix bigotry in your firewall Buyer's Guide was a bit much. Just because your testers were unable to configure a Unix host (they must know little or nothing about Unix to have had the problems described) does not mean that Unix should be dismissed out of hand as a fire-

wall operating system platform.

If you are to be an unbiased source of technical knowledge, please at least use testers who are qualified to install and operate the equipment under test. Any-

thing else looks like partisanship in a holy war.

*Tom Byrnes
Applications engineer
American Digital Network
San Diego*

Teletoons



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IP SWITCHING: The search for truth

A guide to choosing the route that's right for you.

By Mary Petrosky

When it comes to IP switching, vendors' cards are on the table. Now it is up to you to decide who has the best hand, or whether you should hold your bet.

Ipsilon Networks, Inc. catalyzed the industry a year ago with the announcement of its IP Switch ATM 1600, a device that marries the speed of switching to the control functions of routers. Cisco Systems, Inc. soon followed with its Tag Switching scheme, 3Com Corp. unveiled Fast IP, and Cascade Communications Corp. introduced IP Navigator. And all the while, the ATM Forum has been working on the Multi-Protocol over ATM (MPOA) specification, which is a somewhat different means to the same essential end.

Ipsilon's IP switching is an innovative approach to the router bottleneck problem. However, the hype around it — and the industry's rush to label all subsequent schemes "IP switching" — have obscured key aspects of these technologies.

For one thing, most of the schemes employ a type of shortcut routing designed to limit or avoid the packet-by-packet handling of data by routers. And IP switching is too narrow a term, since most shortcut routing approaches can accommodate multiple protocols, even if IP is the first protocol vendors support. Most shortcut routing schemes also do more than just switch IP; they address problems tightly coupled with routing, such as the interconnection of virtual LANs and network scalability.

To deflate the hype, we'll look at three schemes — Ipsilon's IP switching, Cisco's Tag Switching and MPOA — with an eye to how they might, or might not, benefit your organization. In particular, we'll look at each scheme's ability to scale and its support for VLANs, quality of service (QoS) and multicasting.

IP switching

Ipsilon positions its technology for use in LANs and WANs. IP switching can opti-

mize traffic in pure IP environments, and where tunneling or encapsulation of non-IP protocols (such as IPX, NETBIOS, SNA or DECnet) is used. Currently, IP Version 4 is supported, with Novell, Inc. IPX support due this quarter.

IP switching uses a flow classification scheme whereby, based on the type of traffic it sees, an IP switch shifts between standard store-and-forward, packet-by-packet router operation and what Ipsilon calls cut-through switching operation.

Ipsilon currently supports IP switching on top of ATM hardware, using two protocols it defined: the Ipsilon Flow Management Protocol (IFMP) and the General Switch Management Protocol (GSMP). Ipsilon also plans to implement IP switching over frame relay and Gigabit Ethernet switches.

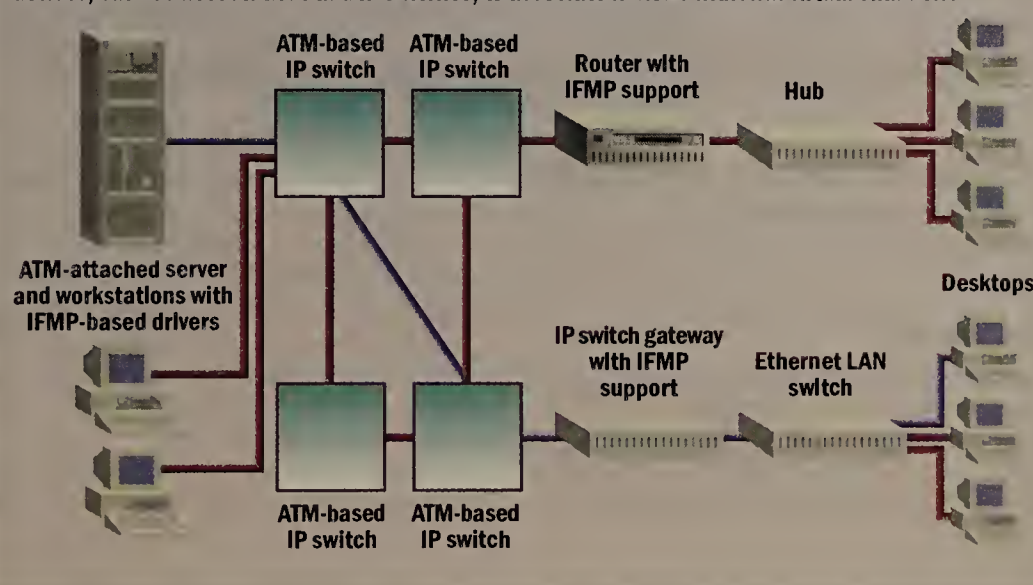
IFMP enables communication between IP devices, such as host stations and IP switches, by associating IP flows with ATM

virtual channels. A flow is a sequence of IP packets between a particular source and destination that share the same type of protocol — type of service and other characteristics, as determined by information in the packet header. Once a flow is identified, and isolated to a particular I/O channel, the IP switch sets up a cut-through connection.

GSMP controls the underlying ATM switch hardware, enabling an IP switch controller to establish and release virtual channels, manage switch ports, request configuration information and so on (see Figure 1).

FIGURE 1: IP SWITCHING

When certain IP-based traffic flows are identified, a virtual channel is established among ATM-attached devices. Ipsilon has defined the Ipsilon Flow Management Protocol (IFMP) to enable ATM-attached IP devices, such as host stations and IP switches, to associate IP flows with ATM virtual channels.



Pros and cons

The most obvious benefit of IP switching is its performance. Ipsilon claims IP switches can forward packets at the rate supported by the underlying switch engine, which is as fast as 5.3 million packet/sec for Ipsilon switches and 18 million packet/sec for IP switches from Digital Equipment Corp., which licensed Ipsilon technology. These claims have not been independently verified, however, due to a lack of appropriate tests.

For the biggest performance boost, as many ATM-attached nodes as possible should support IFMP and as much network traffic as possible should traverse IP switches.

For best results, your network traffic also needs to match the flows that the IP switch expects to see. New releases of IP switching software allow you to adjust the flow classification mechanism to identify specific flows and how you want to handle them. Keep in mind that if your traffic patterns change over time, you will need to tune the IP switches accordingly. Also, since few devices support IFMP, you may need to use Ipsilon's PC-based IP switch gateway, which has relatively low performance, to get legacy LAN traffic onto the IP switch backbone.

As a routing solution, an IP switch is certainly less expensive per port than a traditional router, although it doesn't support the same array of protocols. And because it's a routing scheme, IP switching does not support VLANs.

Critics of IP switching, including Cisco, also question its ability to scale, because it



LYDIA HESS

relies on setting up virtual circuits. In the wide area, IP switches would need to set up hundreds of connections per second, and switches capable of that would be too expensive to deploy.

Ipsilon officials argue that IP switching can be deployed so that multiple flows are aggregated onto a single connection in the center of a network, thus conserving switch resources. Conversely, at the edge of the network, flows — and their specific handling — can be more granular.

It's too early to say with certainty, but with vendors experienced with WANs helping

IP switching approach. For example, 3Com will use its Fast IP to communicate across a LAN and use IFMP only to communicate from its routers to Cascade WAN switches. Cascade will then use its IP Navigator technology for communication across the WAN.

Cisco's Tag Switching

The second major shortcut routing scheme is Cisco's Tag Switching, an example of a label-swapping approach.

Cisco positions Tag Switching for use in the WAN, particularly the Internet, and

sharing, to establish a secure path or for QoS support.

Tag Switching has clear benefits in Internet and WAN applications and less obvious benefits in campus networks. For example, Cisco has proposed a multilevel system of tags to indicate route information within a routing domain (interior routing) and across domains (exterior routing). This decoupling of interior and exterior routing means tag switches in the middle of a routing domain would need to track less routing information. That, in turn, would help the technology scale to handle large networks, such as the Internet.

Tag Switching could provide a similar benefit to corporate users that have large ATM-based backbones with routers as edge devices. In this design, as the network grows and more routers are added, each router may need additional memory to keep up with the increasing size of the router tables. In addition, this design could result in long convergence times when the network undergoes changes.

Tag Switching promises to alleviate these problems by having the ATM switches use the same routing protocols as routers. In this way, the routers on the edge of the backbone and the ATM-based tag switches in the core would maintain summarized routing information and only need to know how to get to their nearest neighbor, not to all peers on the network.

As with IP switching, Tag Switching's performance is gated by the underlying hardware. According to Cisco, customers should expect only modest performance gains when implementing Tag Switching on the 7500 series of routers, although it will provide traffic control capabilities such as those noted above. In the short term, Tag Switching on the LightStream 1010 campus ATM switch, which has an aggregate throughput of approximately 5G bit/sec, will yield the highest performance gains.

Because it's essentially a routing scheme, Tag Switching does not explicitly support VLANs. Tag switches will make a forwarding decision based on the Tag Switching tag and ignore 802.1q VLAN tags, unless configured to do otherwise.

Tag Switching supports QoS in the same shorthand way it supports routing. Some form of QoS — whether class-based queuing or separate virtual channels — must first be in place. With RSVP, for example, a tag switch would allocate a tag corresponding to each reservation made.

Tag switches can forward multicast traffic by associating a tag with a multicast tree. To avoid overlap among multicast groups, Cisco has proposed extensions to existing multicast protocols that would allocate tags among multicast tag switches operating across a common network.

Be aware that Cisco plans to implement Tag Switching in advance of a standard, so

some disruption is inevitable when you later upgrade to the fully standard version. The Cisco software that includes Tag Switching will be available this spring for the 7500 routers and the LightStream 1010. In the fall, Cisco will support Tag Switching via a new routing module on the Cisco StrataCom BPX.

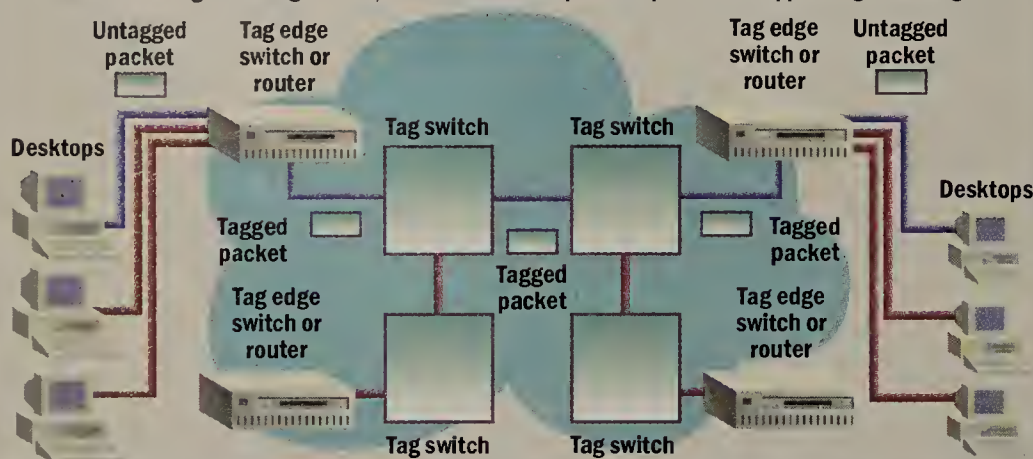
MPOA

While Tag Switching has a way to go in the standards process, the ATM Forum MPOA specification is nearly complete and stable enough to implement.

MPOA is based on an enhanced version of LAN Emulation (LANE) and the Next Hop Resolution Protocol (NHRP), along with other technologies. Where LANE pro-

FIGURE 2: TAG SWITCHING

With Tag Switching, packets are forwarded based on labels, or tags, that represent network layer routing information. For Tag Switching to work, all the devices in a packet's path must support Tag Switching.



out, including General DataComm, Inc., there is reason to believe the scaling problem will be solved.

On the plus side, IP switching can support QoS without requiring that applications or operating systems be rewritten to explicitly request QoS, as is the case with the Resource Reservation Protocol (RSVP) and ATM-based QoS schemes. IP switching can support QoS based on implicit IP information, such as an IP address or TCP/User Data Protocol port, that you can configure into the switch.

GSMP also supports a scheme whereby a priority can be assigned to a connection when it's established. Ipsilon has defined a fairly broad priority system, which you can configure based on whatever IP information (address, subnet, network, protocol, application, or I/O port) you deem relevant.

IP switching supports native IP Multicast, including standard IP Multicast protocols such as the Distance Vector Multicast Routing Protocol and Interior Gateway Routing Protocol, via flow classification. Short-lived multicast traffic is forwarded by the IP routing software running on IP switches and is not switched.

Although IP switching is an open but proprietary technology, meaning third parties can implement it, Ipsilon maintains control over its development. Given that, some vendors are reluctant to support it.

But the technology did get a vote of confidence in January when 3Com, IBM and Cascade announced they'll use IFMP to integrate their respective LAN and WAN environments. However, these companies are embracing IFMP only as a means of communication among their equipment and are not planning to support the full

large corporate intranet. The company views it as a way to scale router backbones based on interconnected routers or edge routers connected via switches. Tag Switching can be implemented over many media types and is independent of Layer 3 protocols.

Under Cisco's scheme, devices called tag switches route packets in a shorthand way based on labels, or tags, that represent Layer 3 routing. Each tag switch maintains a table of tag-to-route bindings. A tag has only local significance; a tag switch tracks incoming and outgoing tags for all routes it can reach, and it swaps an incoming tag with an outgoing tag as it forwards packet information (NW, Sept. 23, 1996, page 17).

Tag switches do not need to read as far into a packet as a router does, so they can forward packets more quickly. Likewise, Tag Switching involves only one reference to memory, whereas a traditional router would perform four to 16 memory references during a single IP routing lookup. Like regular routers, tag switches forward packets on a hop-by-hop basis (see Figure 2).

Pros and cons

Tag Switching is a flexible scheme in that tags can represent destination-based routing, QoS, multicasting or other information. For example, a customer could use tags to "manually" define routes for load

STANDARDS STATUS

Ipsilon IP switching: Several informational RFCs have been published and reference code is available, but Ipsilon maintains control over development of this proprietary technology.

Cisco Tag Switching: Cisco has submitted a proposal to the IETF for standardization, as have several other vendors. A working group has been established.

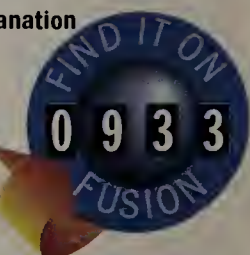
MPOA: ATM Forum expects Version 1.0 of the MPOA specification to be approved in April. The specification is considered stable enough to implement.

Access Network World Fusion for more info on shortcut routing.

- The full 50-page report, "Shortcut Routing: Issues and Implementations," on which this article was based. This report is available for a limited time via a special entrance to The Burton Group Web site from Network World Fusion.
- Previous Network World stories about Ipsilon's IP switching, Cisco's Tag Switching and MPOA.
- Relevant pages from Ipsilon and Cisco sites, as well as a technical explanation of MPOA from Anixter.

Enter the number to the right in the DocFinder box on the home page.

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vides Layer 2 bridging, NHRP provides Layer 3 shortcut routing. Because it encompasses bridging and routing, MPOA supports routable and nonroutable protocols, such as IP, IPX, DECnet, AppleTalk, NETBIOS and Synchronous Data Link Control or Logical Link Control, without needing to encapsulate in IP.

Although MPOA is multiprotocol in nature, most vendors will initially implement IP only. However, Version 1.0 of the specification has enough detail to enable vendors to implement multiple protocols.

NHRP is primarily an address resolution protocol that's being defined by the Internet Engineering Task Force, with extensions added by the MPOA working group. NHRP specifies a request response mechanism that allows a source station to determine the Layer 3 address and the sub-network address (the ATM address) of the "next hop" toward a destination station.

If the destination is connected to the ATM network, the next hop is the destination station. Otherwise, the next hop is the egress edge device (such as a router) nearest to the destination station. Once the destination Layer 3 address is resolved to an ATM address, MPOA allows the data to be sent over a switched virtual channel (see Figure 3, page 39).

Pros and cons

Many vendors position MPOA for use in campus, in part because MPOA addresses how to connect legacy LANs and associated VLANs across an ATM backbone.

MPOA is a good solution for organizations with ATM backbones that want to provide communication between VLANs without the performance hit of going through so-called one-armed routers, with a single ATM interface. Because MPOA is ATM-specific, its benefits are limited to organizations that have deployed ATM.

Some vendors are concerned about MPOA's ability to scale, claiming it is constrained by the fact that one virtual circuit must be set up per shortcut connection. Some also question NHRP's ability to scale. However, FORE Systems, Inc. is exploring ways to use NHRP in the WAN and may have a solution ready later this year. This solution would use NHRP to provide shortcut routing between WAN switches by bringing up virtual circuits as traffic warrants.

FORE has already deployed a prototype of MPOA at customer sites. Based on these trials, the company says MPOA users should see a tenfold performance improvement over networks based on one-armed routers and could see as much as a 50-fold improvement. MPOA performance gains are more noticeable for servers and desktops with 155M ATM or 100M bit/sec Fast Ethernet connections.

As noted already, MPOA implicitly supports VLANs and shortcut routing between VLANs. MPOA allows subnets to extend across an ATM backbone, enabling moves and changes to be carried out without the need for new IP addresses to be assigned.

In contrast, IP switching and Tag Switching are pure Layer 3 solutions that impose the same subnet limitations as routers.

MPOA Version 1.0 does not have specific QoS support. LANE Version 2.0 has mechanisms for associating QoS with LANE connections, and MPOA implementations built on LANE 2.0 will "inherit" this capability. The MPOA working group will address the tie-in between MPOA and RSVP in future work.

MPOA also relies on LANE mechanisms for multicast support. Although multicast traffic can traverse MPOA devices, it is handled on a hop-by-hop basis, so it does not benefit from the performance improvements of shortcut routing.

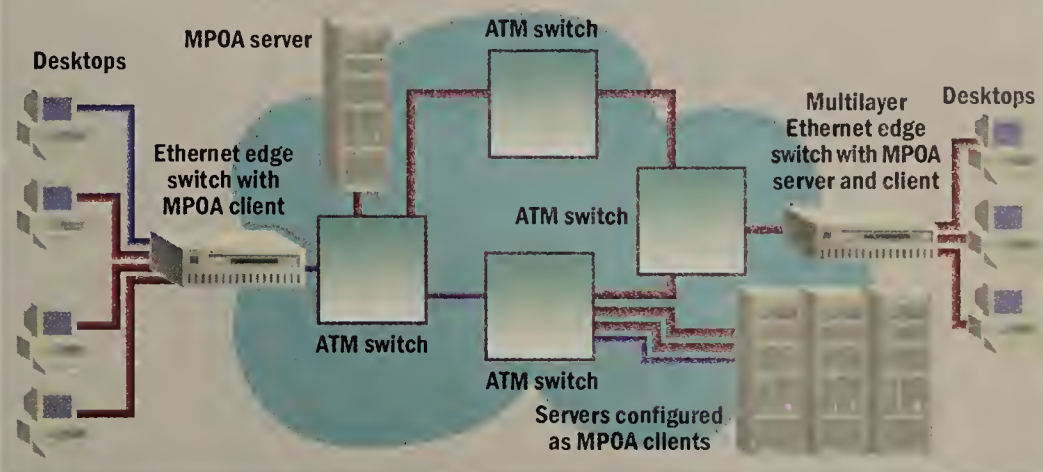
What's right for you?

When deciding which shortcut routing scheme makes the most sense for you, first consider your infrastructure. If you have a backbone based on routers, none of these schemes offers significant performance benefits unless you replace some of your routers with ATM switches or upgrade to next-generation, multigigabit routers that vendors such as Cisco and Juniper Networks, Inc. have under development. These routers may even solve your problems in a more traditional fashion, although they'll be more expensive than the routing schemes presented here.

Corporate customers with an ATM-based backbone can use MPOA, IP switching or Tag Switching. MPOA will simplify inter-

FIGURE 3: ATM-BASED MPOA SWITCHING

When a Multi-Protocol over ATM client wants to send data across an ATM backbone, it queries an MPOA server. The server discovers the ATM address of the destination station, if it is attached to the ATM network or the egress edge device nearest the destination station. Armed with this information, the client can establish a switched connection to the destination.



VLAN communications and, because it reduces the role of routers in traffic forwarding, you should see performance improvements and reduced router costs. IP switching and Tag Switching, however, offer better traffic management, multicast and QoS capabilities.

Alternatively, consider multilayer switches that provide onboard routing, such as 3Com's LANplex, FORE's PowerHub and Madge Networks, Inc.'s LANswitch. Also look for vendors such as Foundry Networks, Inc. (formerly StarRidge Networks, Inc.) and Rapid City Communi-

cations to deliver multilayer switches with high throughput.

The debate about how best to integrate switching and routing will continue for some time. You need to evaluate alternatives in light of your present and future network requirements, and avoid getting caught in the hype of new technology.

Petrosky is a senior analyst at The Burton Group, an information services firm that provides in-depth technology analysis. She can be reached in her San Mateo, Calif., office at (415) 572-0560 or via the Internet at petrosky@tbgroup.com.

FACT {OR} Fairytale?

A firewall-secured, T1 Internet connection \$2,395* per month?

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Put a conference in your PC

Five document-conferencing tools that promise to boost productivity.

By Steven Goldberg

You're at your desk when the PC rings. That's right, the PC. It's letting you know it's time for that important conference call to review network redesign diagrams. You click the mouse a few times, and soon you're jostling about switch placement with cohorts in Huntsville and Herndon.

Sound futuristic? Judging by our test of five document-conferencing and application-sharing tools, we can tell you it's for real. These packages show promise as productivity enhancers by enabling users to collaborate across a LAN, WAN, modem link or the Internet.

If you want the biggest bang for your buck, check out Microsoft Corp.'s T.120-based NetMeeting 1.0, which we found to be the most robust and feature-rich of the five products tested. Those factors, along with its price — it's free — make NetMeeting our top choice ahead of the three other T.120-based products we looked at: DataBeam Corp.'s FarSite 3.0, PictureTel Corp.'s LiveShare Plus 4.0 and Intel Corp.'s ProShare Premier 2.0. It also came out ahead of VocalTec, Inc.'s Internet Conference Professional 2.0, which does not yet support T.120 but offers similar functionality.

T.120 is the International Telecommunication Union standard for real-time multimedia collaboration among network clients (see story, page 41).

How conferencing helps

The benefits of document-sharing technology are far-reaching. With the Internet evolving as a common transport medium, businesses now have a greater ability to work together. Vendors can provide real-time support of their products. Help desk operators can remotely walk users through problem resolution remotely.

You may have heard all this before from vendors of remote control products. However, remote control software typically comprises a single master/slave connection, one that enables you to access and control the operation of applications on a remote PC. Conferencing software gives you real-time multipoint access to applications, plus voice conferencing.

The packages all have roots in the ability to share an electronic whiteboard. But what really makes these products shine, with the notable exception of Internet Conference Professional, is their ability to enable multiple users to collaborate on any application, regardless of whether they all have the given application on their PC.

Each of the products we tested uses TCP/IP or a dial-up link to forge network connections. IPX can also be used with all of the products except Internet Conference Professional. Conference links are established by sending each participant an alert that a conference is being set up. Users can then choose to join the conference.

Navigating the interfaces

The first product differentiator to look at is the user interface used to control the conference, share an application or data, and provide access to an address book where user names and addresses are stored. Addresses can be a phone number, network address, or TCP/IP host and domain name.

NetMeeting provided a concise interface, displaying available functions in a ribbon of smart icons and an attached user list.

ProShare Premier is even fancier, with an interface based on a graphic representation of a conference room (see graphic). Users are represented by swivel chairs, and business cards are used to display information about participants. You can optionally display a person's photo on a business card. A phone icon is displayed when a call attempt is in progress. While all this makes the ProShare Premier interface a bit cutesy, it could help end users accept the concept of document conferencing.

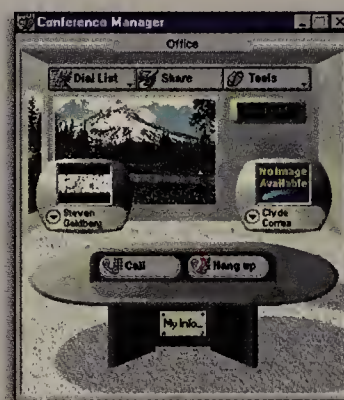
The interface in FarSite and Internet Conference Professional are heavily slanted toward an electronic whiteboard. The main screen consists of a simple ribbon of commands, with a large attached whiteboard window.

The LiveShare Plus interface presents a down-and-dirty button ribbon of available functions. While not fancy, it makes connecting to and collaborating with users a simple process. Once connected, participants are displayed as graphical representations along with icons for an in-box and

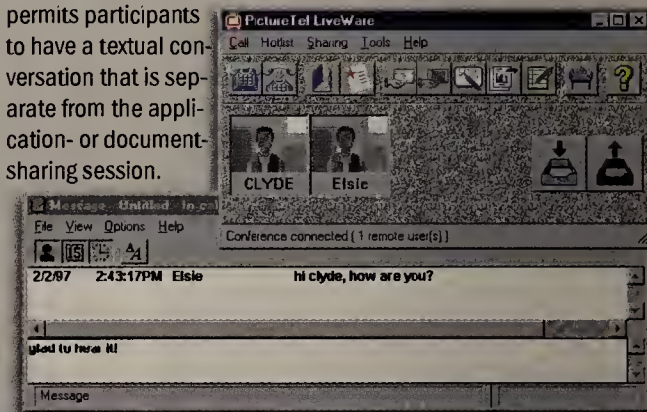
VIRTUAL CONFERENCE ROOMS

Intel ProShare

Premier's top-rated user interface uses an office paradigm, complete with a desk, video screens and a window view. Names of conference participants are displayed on the swivel chair. If a person's photo is available, it too can be displayed on the chair. Caller status information is displayed on the conference table.



PictureTel LiveShare Plus' user interface has a slightly different look and feel, displaying graphical representations of conference participants along with their names. There is a chat window that permits participants to have a textual conversation that is separate from the application- or document-sharing session.



out-box that are used to transfer files among conferencees.

Applications for all

While the user interface is key to finding your way around, the ability to share data from any application is at the heart of these packages.

With the exception of Internet Conference Professional, each product we looked at can share an application among all participants, regardless of whether the application is installed on everyone's hard drive. Typically, screens from an application run-

the application you share has to be running first. Once selected, the application appears on the Windows 95 taskbar of all participants, and NetMeeting tags the top right corner of the shared application window with the host's name, making it easy to see its origin.

NetMeeting has two levels of application sharing. The first gives call participants view-only access to a document. This is useful for, say, intranet-based training. Users can see — and even hear — how to use an application without running the risk of inadvertently hitting a key that can mess things up. Selecting "Collaborate" from the NetMeeting menu extends half-duplex editing capabilities to everyone.

ProShare Premier also has robust, intuitive application sharing. All you do is press a share button to share an application that's already running. The product then frames the shared application's window with its own toolbar, which gives access to all sharing functions and allows the host to easily regulate application access.

ProShare Premier does NetMeeting one better by offering three levels of sharing access. In free-for-all mode, any user is allowed to take control of the cursor at will. If there is a "collision," the product presents a prompt to the conflicting users along with selections for resolving the problem.

In single-cursor mode, a user maintains edit control until mouse or keyboard input stops. Single-cursor mode is the baseline standard among all these applications. ProShare Premier offers the ability to lock out other users from edit access to an application.

With the beta version of LiveShare Plus, sharing an application is a matter of clicking on it. You can extend edit or view-only access to conference participants. It is a little annoying that the host machine does

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Network World Fusion has links to Web sites where you can get white papers about document conferencing, download the latest version of Microsoft's free NetMeeting software and learn more about the T.120 standard. Enter the number above in the DocFinder box on the home page.

ning on one machine are broadcast to the other clients in the conference for display.

Users can then take turns controlling the operation of the application, feeding commands and data from a remote machine to the one running the application. Everyone else can watch the results as the application refreshes the screens on all the clients.

With FarSite, sharing an application is a simple matter of clicking a "Share application" button and choosing a running application or starting a new one for sharing. The standard Windows 95 Close, Maximize and Minimize buttons get an additional lightning bolt button to indicate which application is being shared.

It's just as easy with NetMeeting, although





HOW WE DID IT

We put a Dell Computer Corp. Precision P60 and Dimension P90 running Windows 95 on an Ethernet LAN and used TCP/IP plus IPX — in products supporting that protocol — to establish conferencing sessions. Once sessions were established, we tested a number of key features, including the user interface, application-sharing support and file transfer capabilities. We also tested the integrated audio and chat support in the products that have those features.

Chat it up

Applications aren't the only things conferencing packages can share. Three of the packages we tested — NetMeeting, LiveShare Plus and Internet Conference Professional — have a chat facility that enables conferencees to have a running text-based conversation. This gives users the ability to enter comments as they review and edit a shared document.

While it may not seem like the hottest feature, real-time chatting is important if audioconferencing is not available in your conferencing product, your PC lacks multimedia capabilities or your only phone line is used for a dial-up connection.

When collaborating on a document requires a conversation among the parties, an integrated audio feature becomes essential. Internet Conference Professional and NetMeeting are the only two products in this review to support audioconferencing out of the box. Internet Conference Professional supports a one-to-one conversation, while NetMeeting supports multipoint voice conferencing.

Shared whiteboard

You can also share an electronic whiteboard to exchange data with any of the five products tested. With this feature, you are presented with a blank page, as with Microsoft Paint, and a set of drawing tools. The whiteboard is most useful for ad hoc discussions, rather than for formal presentations or when joint document editing is required.

NetMeeting matches Microsoft Paint's interface almost exactly. Additional features enable collaboration, such as screen capture, and multiple-page support. LiveShare Plus is almost identical to NetMeeting in this area but has a slightly different look and feel.

FarSite calls its whiteboard a workbook, one that separates pages by folder tabs. It uses a floating toolbar to draw, highlight and annotate. The FarSite workbook is integral to the product's main user interface. If application sharing is what you're after, the workbook takes up quite a bit of unnecessary space.

Like FarSite, Internet Conference Professional

al uses a whiteboard as its main user interface. It has a basic set of drawing and editing tools, as well as the ability to act as a host for any OLE 2.0-compatible application. Documents can be viewed and edited within the whiteboard.

ProShare Premier's whiteboard and Note-book comes with a spiral binder. In addition to supplying simple drawing tools and an easy means for sharing data on the fly, Note-book has a utility that reads and displays print-capture output for quick

and easy viewing — but without the ability to edit.

While each product had strengths and weaknesses, Microsoft's NetMeeting emerged as the overall leader. Given its support for audioconferencing, its intuitive interface and the fact that it's free, it's a tough act to beat.

Goldberg is a technology manager at a financial services firm. He can be reached at sgoldberg@pobox.com.

T.120 at work

If you're about to plunk down some dough on a document-conferencing package, it wouldn't hurt to make sure it supports the International Telecommunication Union's (ITU) T.120 data-conferencing interoperability standard. But don't count on being able to mix and match products.

The four T.120-based products we tested have implemented the standard to such varying degrees that you should focus on a single product's feature set rather than on how you can mix different vendors' products.

T.120 is really a suite of standards that together form a soup-to-nuts protocol that determines how users can share applications and their associated data over LANs and WANs. When it is joined in a product with the H.323 protocol suite that defines audioconferencing and videoconferencing standards for packet-switched networks, you get real-time audio/video conferencing over data networks.

What follows is an outline of the most important pieces of T.120 and the functions each performs.

● T.121 specifies the Generic Application Template. This allows applications to be shared by participants who may not understand the

application's functionality.

● T.122 specifies Multipoint Communication Services, which describes multipoint conferencing services for developers.

● T.123 specifies an open protocol stack. The platform-independent specification enables the development of T.120-compliant systems across heterogeneous operating systems and networks.

● T.124 specifies Generic Conference Control, which is used to govern how data conferences are controlled.

● T.125 defines Multipoint Communication Services. It is an OSI-compliant protocol that can be used across disparate client and network operating systems.

● T.126 specifies how still images are transmitted, while T.127 specifies how binary files are transmitted.

Each protocol in the T.120 suite interacts with its underlying protocol to achieve reliable data transmission. For example, to transmit a still image, an application uses the T.126 protocol. T.126 interfaces with Generic Conference Control and, in turn, with the Multipoint Communication Services, which then passes the image to the network protocol in use on the sender's machine.

— Steven Goldberg

ScoreCard

	FarSite	ProShare	NetMeeting	LiveShare Plus	Internet Conference Professional
Overall score	5.8	6.2	6.7	6.1	5.3
Interface (25%)	7	8	7	7	7
Application-sharing support (25%)	7	7	7	7	4
Integrated audio support (20%)	4	4	7	4	6
Network protocol support (15%)	6	6	6	6	4
File transfer (5%)	6	6	6	6	6
Native 32-bit client (5%)	3	3	5	5	5
Chat (5%)	3	6	6	6	3

Scores are based on a scale of 1 - 10. Categories are weighted by the percentages shown.

NetResults

Product	FarSite 3.0	ProShare Premier 2.0	NetMeeting 1.0	LiveShare Plus 4.0, beta 2	Internet Conference Professional 2.0a
Vendor	DataBeam Corp. (606) 245-3500 www.databeam.com	Intel Corp. (503) 264-7000 www.intel.com	Microsoft Corp. (800) 426-9400 www.microsoft.com	PictureTel Corp. (800) 716-6000 www.picturetel.com	VocalTec, Inc. (201) 768-9400 www.vocaltec.com
Price	\$199	\$199	Free	\$149	\$149.95
Pros	▲ User interface is easy to use and navigate ▲ Good application-sharing facility	▲ Provides a familiar user interface ▲ Good print-capture utility	▲ Integrated multipoint audioconferencing ▲ Intuitive user interface	▲ Ability to take control of remote desktop ▲ Conference wizard easily creates call	▲ Integrated point-to-point audioconferencing
Cons	▼ Whiteboard interface is overkill for application-sharing needs	▼ No chat facility	▼ Lack of remote control	▼ No chat facility	▼ No support for IPX ▼ No true application sharing ▼ Clumsy document-sharing interface

Management Strategies

Covering: Career Insights and Innovations
in Managing Staff, Budgets and Technology

Briefs

■ **The Electronic Messaging Association (EMA)** will sponsor **EMA '97** April 6-10 in Philadelphia. You can attend sessions on hot issues such as Internet technology vs. groupware, electronic commerce, directories, security, and application and infrastructure management. There also will be multilevel tutorials on building a messaging network, collaborative and integration tools, multiprotocol transports and IPv6 issues.

A new Enterprise Land exhibit will demonstrate applications such as open electronic data interchange and security running on an X.500 directory structure.

The complete conference costs between \$795 and \$895 for EMA members and between \$1,045 and \$1,145 for nonmembers. Tutorials are available for an extra charge.

EMA: (703) 524-5550.

■ **Wave Technologies International, Inc.**, an IT training company, has joined with network storage management software company **Legato Systems, Inc.** to offer training on Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare.

Legato NetWorker 4.3 for Windows NT is a two-day course priced at \$795. Legato NetWorker 4.X for NetWare, a one-day course, costs \$395. Both will be offered at Wave's training centers in Chicago, Dallas, Reston, Va., and West Los Angeles starting this month.

Wave: (800) 828-2050.

■ **Shiva Corp.** has rolled out the first level of training for Shiva Certification. Called **Remote Access — Level 1**, the one-week course consolidates training on all of Shiva's key products. After completing the course and passing a written exam, students qualify as Shiva Remote Access Specialists. They can then enroll in a one-week certification program that will launch this summer.

The cost of Level 1 training is \$2,500.

Shiva: (617) 270-8810.

Amdahl spin-off rolls out Web-based training tools

New package paves the way for users to develop online learning sites.

By Jim Brown

Pebblesoft Learning, an offshoot of Amdahl Corp., is the latest company to jump on the Web-based training bandwagon with the introduction today of its Pebblesoft Learning Delivery System software.

The product runs on Windows NT- or Unix-based servers and is aimed at helping large companies and value-added resellers build intranet or Web sites capable of delivering interactive training on a variety of topics.

Oracle Education's Oracle Learning Architecture Web site and Microsoft Corp.'s Microsoft Online Institute already offer online training.

Pebblesoft says it will use the new package to develop its own Web-based training service to compete with Oracle and Microsoft and develop training programs for other industries. In fact, Pebblesoft's genesis came from an ongoing Amdahl pro-

ject to develop an intranet-based training program.

The Pebblesoft Learning Delivery System includes object-oriented programming tools for building courses and learning modules comprising video, audio and text. There is also a

sion utility that reduces the amount of bandwidth required to transmit video and audio, and a utility that converts existing computer-based training programs to run across the Internet.

Students access their courses via a Web browser and use a Pebblesoft search engine to look for training material. Before signing up for a course, students can play a learning assessment game to get a feel for how to use the software. Once they start a course, students can create a virtual notebook that can be used in the future.

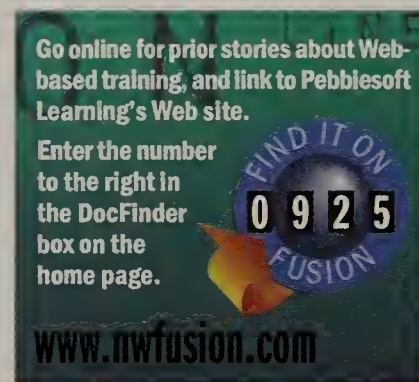
A management tool enables training managers to track course usage and figure out whether students are taking entire courses or mixing and matching modules from various courses to build customized

training.

The management tool can also track how students respond to certain questions, so course content can be modified if failure rates are too high. ■

WHAT YOU GET WITH THE PEBBLESOFT LEARNING DELIVERY SYSTEM

- A single copy of Pebblesoft Learning Course Builder and Compressor, which can be used with various computer-based training authoring tools to develop courseware modules that contain compressed video and audio.
- Pebblesoft Learning Library Agents, which translate courseware for storage in an object-oriented Illustra database management system.
- Pebblesoft Learning Management software, which enables you to set up student accounts, track course usage and measure the success of the training programs.
- Pebblesoft Search Engine, which enables students to search the Web or intranet site for material.
- All server software runs under Windows NT or Unix.
- Pricing is based on the number of students per server.
Up to 25 students: \$15,000
Up to 250 students: \$50,000
Unlimited students: \$125,000



NETWORK BOOK REPORT

Web & New Media Pricing Guide

J.P. Frenza and Michelle Szabo (Indianapolis, Hayden Books) 295 pp., \$40. Phone: (800) 428-5331; ISBN: 1-5830-33-X.

This book is written for new media professionals — those who develop Web sites and multimedia CD-ROMs. It has pointers for developing proposals and pricing methods you can take to management for approval of Web site and CD-ROM publishing ideas. The book also passes along advice on formulating a strategy for dealing with customers.

Full of eye-opening case studies and packed with many specific examples, the book is equally well suited for managers who need to outsource Web site construction. Ideas of what to ask for in a proposal from potential outsourcers are presented,

along with the available levels of service and their price points.

Mainstream Videoconferencing

Joe Duran and Charlie Sauer (Reading, Mass., Addison-Wesley) 282 pp., \$34.38. Phone: (800) 822-6339; ISBN: 0-201-84747-7.

Videoconferencing technology has made great strides in recent years, and many pundits say it is poised to become a key factor in enhanced global communications. This book is written for readers of all levels looking to bone up on videoconferencing. The first of three sections gives an overview of room and desktop videoconferencing and explores the challenges of multi-point usage. A discussion of possible

applications follows.

The second section can help technical professionals learn to navigate analog and digital television environments and build an infrastructure to support videoconferencing.

The last section sheds light on how remaining barriers such as establishing the right type of connections among conferencing systems can be eradicated.

Information about the International Telecommunication Union's telecommunications standardization division, the ITU-T, video standards and Web resources round out the book.



For more about the books reviewed here, link to their publishers' Web sites from Network World Fusion.

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Senior Programmer/Analyst. Design and develop patient assessment and tracking software using object oriented 4GL RDBMS languages including DataFlex, PowerFlex, and Oracle; conduct database administration, including entity relation diagramming; design and implement technology based programming innovations including pen-based computing and scanning; program applications in Windows 95, Windows NT and Novell Netware environment. M.S. degree in Computer Science or Computing and Information Science. 3 years related experience in database design using DataFlex, PowerFlex and Oracle (SQL* Form & SQL* Report) and GUI application design using Visual Basic and C. Salary \$47,000 per year. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to 1117 Trinity, Room 424T, Austin, TX 78701, JO#TX7856068. Ad Paid by an Equal Opportunity Employer.

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Informix DBA/Developer: Design GUI database applications using NewEra. Implement and develop database replication using Informix Online 7.x. Implement stored procedures and maintained data integrity. Make performance tuning and enhancements. Req: 2 years of related experience in Informix database development & administration, including the use of NewEra. Master's Degree in Electrical Engineering or Computer Science. Yearly salary \$65,000/year. Send resume to Jennifer Lindsey, Decision Consultant, Inc., 5000 Quorum Drive, Suite 410, Dallas, TX 75240. Ad Paid by an Equal Opportunity Employer.

System Analyst. Design & Implement multi-vendor LAN/WAN systems for clients in oil and gas exploration. Install and upgrade Novell Network. Integrate multi-vendor PC network in different UNIX & VAX/VMS platform. Test and modify programs in assembly languages and C/C++ to ensure Network comparability and efficiency. Bachelor's degree in Computer Science, Computer Engineering, or Computer Electronics. 2 years of related experience in basic programming in assembly language and C/C++. Must be a Novell Authorized CNE. Salary: \$36,000.00/yr. Send resume to: Carole Lin, Vice President, Sino Technology Services, Inc., 2415 Coit Rd., Suite A, Plano, TX 75075. Ad Paid by an Equal Opportunity Employer.

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Network Planner

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The growing Barnett network relies on the most sophisticated telecommunications systems capabilities in almost everything we do. Currently, we have a position available which will provide day-to-day support to our user base of over 1,000 employees to ensure the highest quality and effectiveness from our systems network which consists of a multiplatform environment integrated into a voice/data wide area network.

To qualify, you'll need experience with Lucent G3 ACD, CMS, Reports, Routing, and must be Split & Vector certified for Call Center administration and design. An understanding of advanced networks and a working knowledge of PC operations with MS Windows 3 or Win95, word processing and spreadsheet applications are also required. The ability to translate business needs into call center customer services and a background in Banking, Brokerage, Credit Card, Finance, Loans or a Trust business are preferred, along with certified system and software administration for Lucent Legend, #5ESS, Audix Voice Mail System, NorTel DMS, Meridian PBX, Meridian VMS, Norstar, NEC Neax, Mitel SX200d, Call Star VMS, Centigram VMS, Octel VMS, GeoTel Network Interface Controller (NIC), and/or FLEX Service NIC.

As one of the top 25 financial institutions in the nation, we offer competitive compensation and a generous, flexible benefits package. If you're ready for leading-edge challenges...with a team that's shaping the future of the financial services industry, please fax/mail resume with salary requirements to: Barnett Staffing Services, Attn: Source Code EA076TU56, P.O. Box 44147, Jacksonville, FL 32256. FAX: (904) 987-0325. An eo/aa employer. BARNETT SUPPORTS A DRUG FREE WORK ENVIRONMENT. "Barnett is a registered trademark of Barnett Banks, Inc."

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Exciting new opportunities are in the picture at General Instrument in San Diego. We've achieved global leadership in cable and satellite TV, and we're creating the most advanced next-generation telecommunications networks in the world. If you're ready to take your engineering career to the next level, consider making the leap with a world-class leader in advanced network communication systems. The following challenges are currently available at GI in San Diego:

MANAGER, NETWORK INTEGRATION & SERVICES

Reporting to Director of Marketing, position is responsible for developing/implementing network integration and planning. Requires BSEE/CS (MBA preferred) and 5-10 years of experience in telecommunications/network industry, including systems integration, project planning, program management, customer support and general management. Travel required. Consulting background a plus. (Code: KSBNSNW)

APPLICATION ENGINEER

Network Design & System Engineering (Philadelphia Area)

Position provides network design planning, system engineering and sales support. Will assist customers in network design planning, recruitment definition, and coordination of site survey/preparation, and will support managers with customer meetings, product presentations and RFP response. Requires BSEE/CS and 5-7 years of experience in advanced communications networking, including routing, ISP systems, LAN/WANs, and client-server systems. Excellent communication skills essential. Travel required. (Code: KEZANW)

NETWORK DESIGN AND SYSTEM ENGINEERING

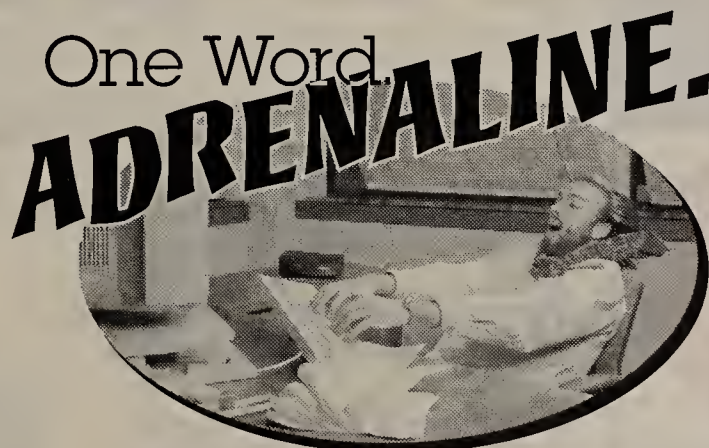
Provides network design planning, system engineering and sales support for GI's SURFboard™ line of advanced cable modem and Internet products. Will assist customers in network design planning; define customer requirements; coordinate site surveys/preparation; and support account managers with customer meetings, product presentations, and RFP responses. Requires BSEE/CS and 5-7 years of experience in advanced communications networking. Knowledge of routing, ISP systems, LAN/WANs, and client-server systems essential. Must have excellent verbal and written communication skills. (Code: KNDNW)

To join GI on the next level, access our Website for more information on these exciting career opportunities: www.gi.com

General Instrument offers competitive salaries and benefits. Please send your resume with salary history/requirements to: General Instrument, Code: __, 6262 Lusk Blvd., San Diego, CA 92121; E-mail in ASCII Text only: sd_jobs@gi.com Equal Opportunity Employer. Principals Only, Please.

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All positions require previous experience in the communications arena.

To apply for these positions, please send your resume **INDICATING POSITION TITLE OF INTEREST and JOB CODE: XA-NWW03** to: Com21 Inc., 750 Tasman Dr., Milpitas, CA 95035. Fax: (408) 953-9299 or e-mail: sjm_res@com21.com (ASCII only). Or call our Job Hotline at (408) 953-9268. EOE.

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We are looking for a take charge individual to support our existing infrastructure and help us implement the next generation of systems which will include both Unix and NT servers and a mixture of Macintosh and Microsoft clients. The Network Manager will be responsible for the design, implementation, upgrade and support of Network World's network including the maintenance of servers, Ethernet hubs, switches, routers, firewalls and remote access devices.

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At Network World, we provide generous growth opportunities for those with the energy and drive to pursue excellence, as well as the compensation you would expect from a global leader. Network World is part of the International Data Group, the world's leading provider of information services for the information technology industry with over 8,500 employees worldwide.

Interested candidates can should send their resumes to: Network World, Human Resources, 161 Worcester Road, Framingham, MA 01701. email: dvolpe@nww.com; fax: 508/820-3340. For more information about Network World and IDG, visit our home page at <http://www.idg.com>.

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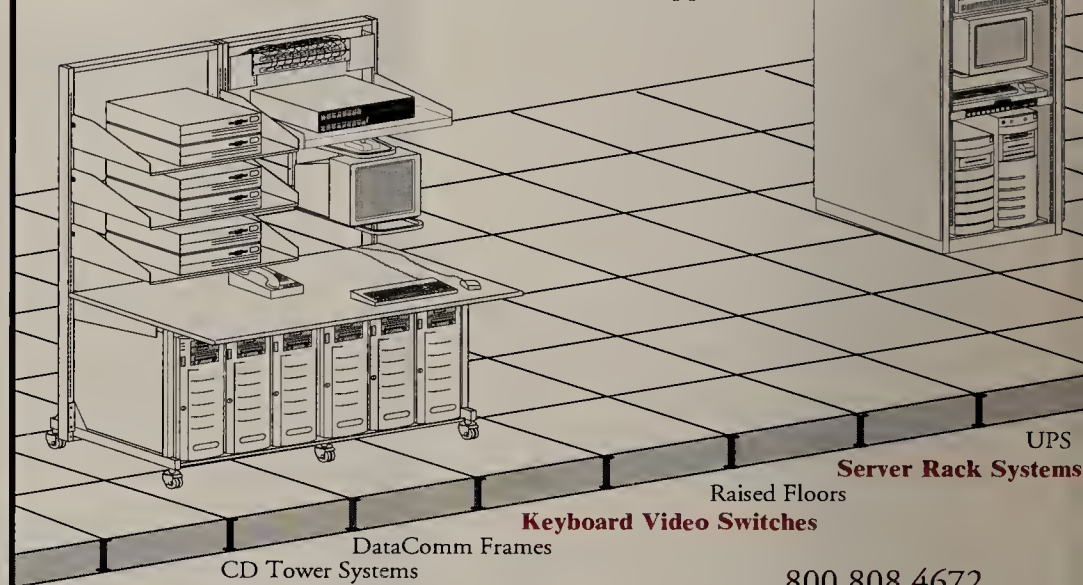
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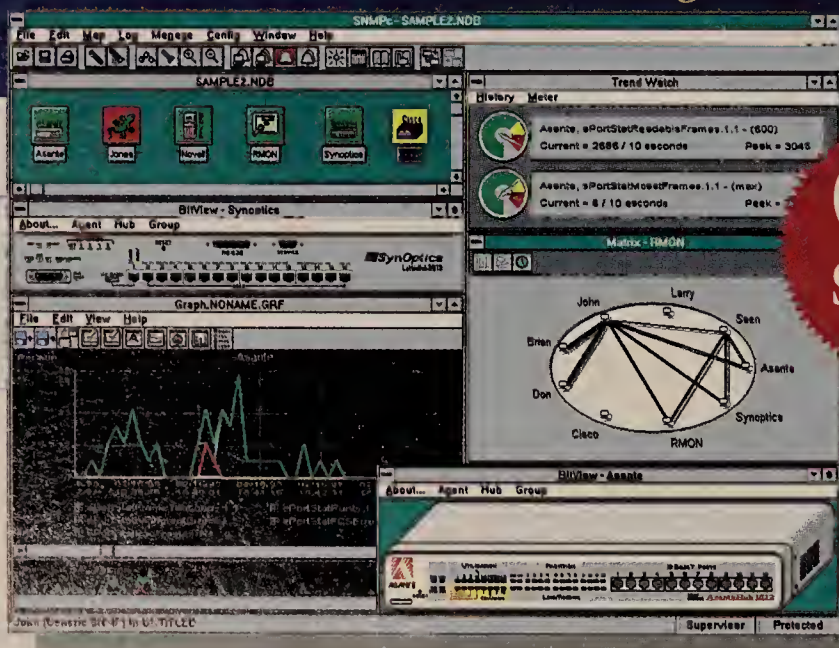
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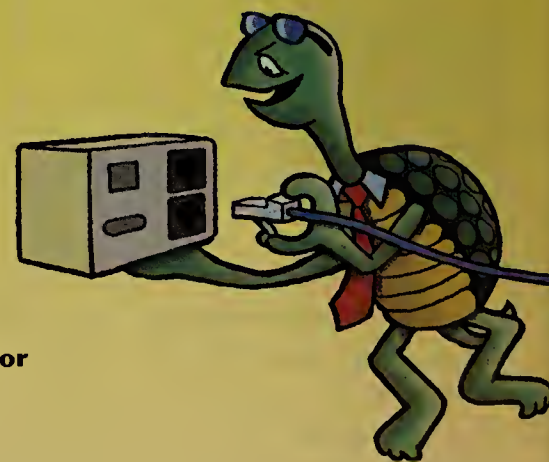
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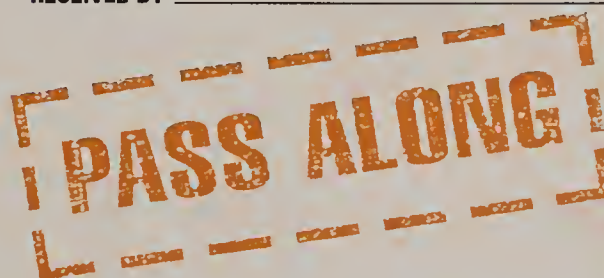
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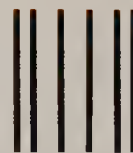
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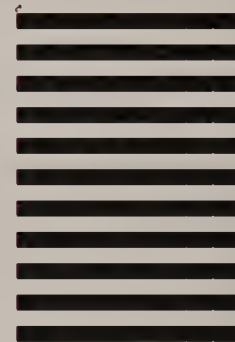
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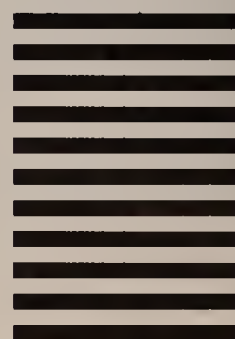


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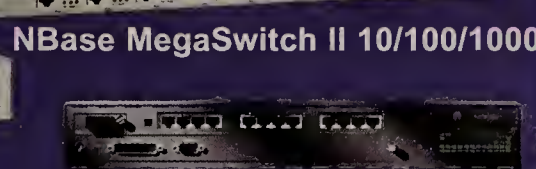
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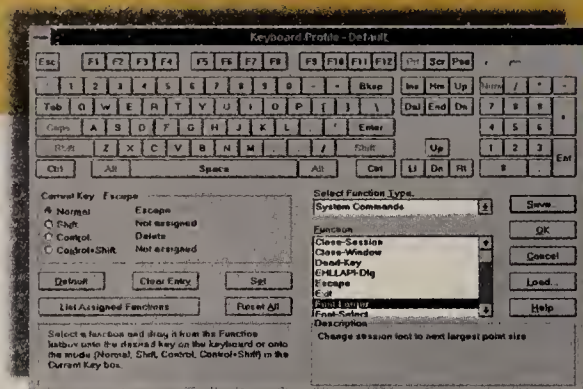
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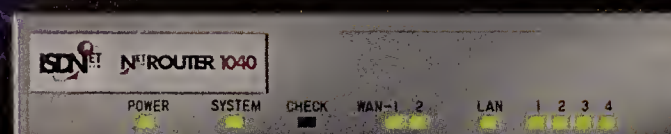
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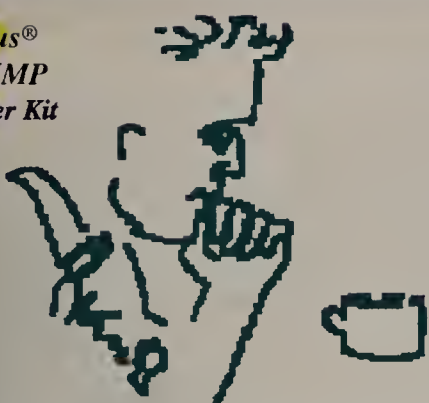
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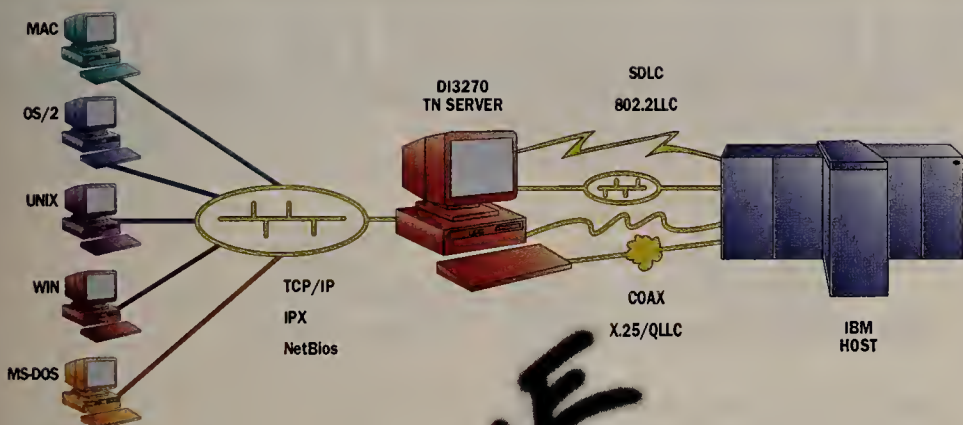
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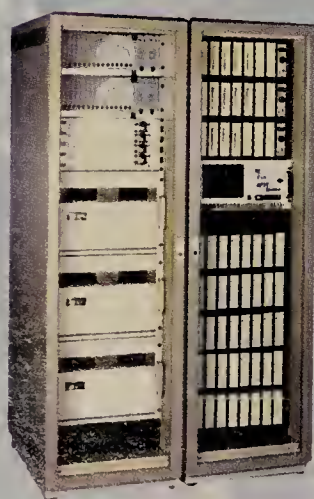


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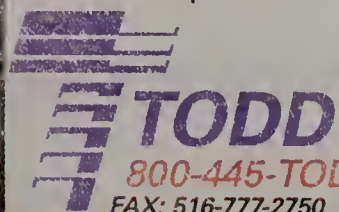
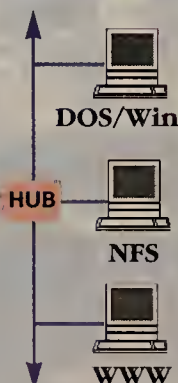


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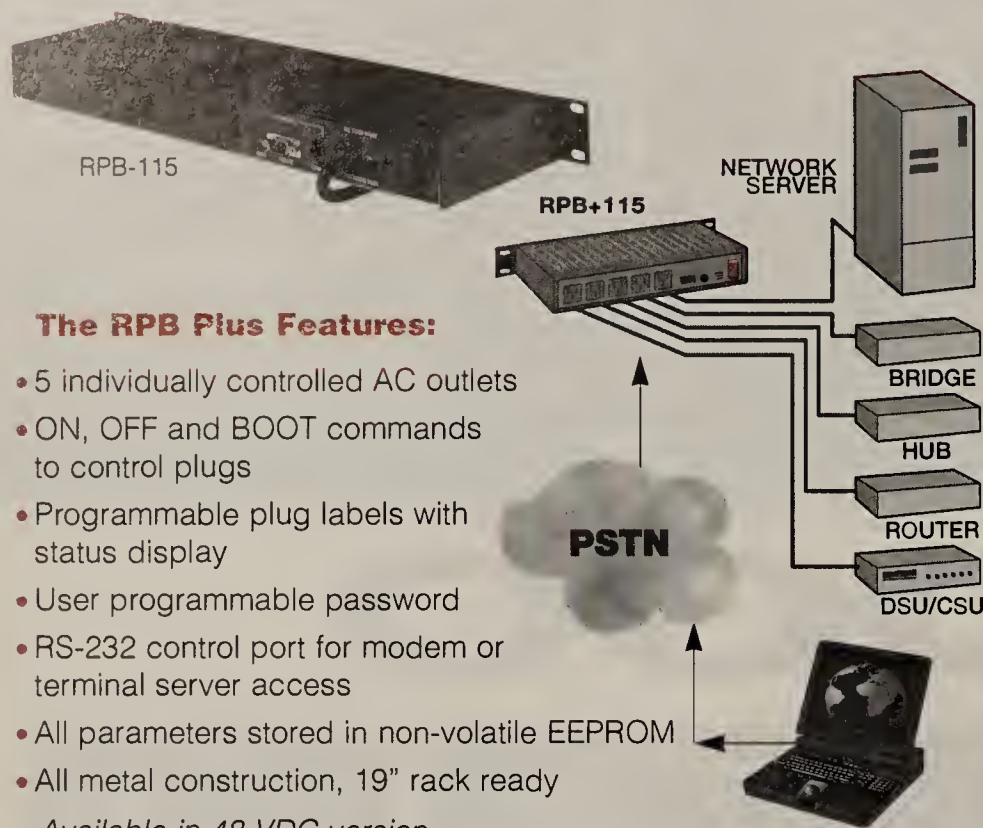
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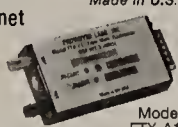
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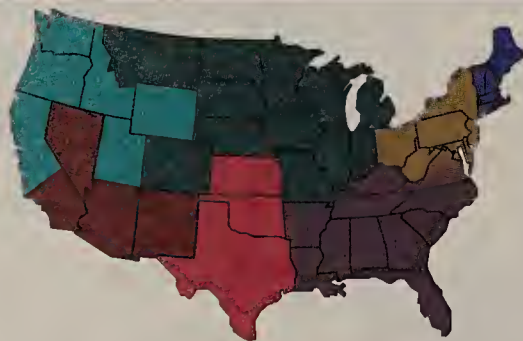
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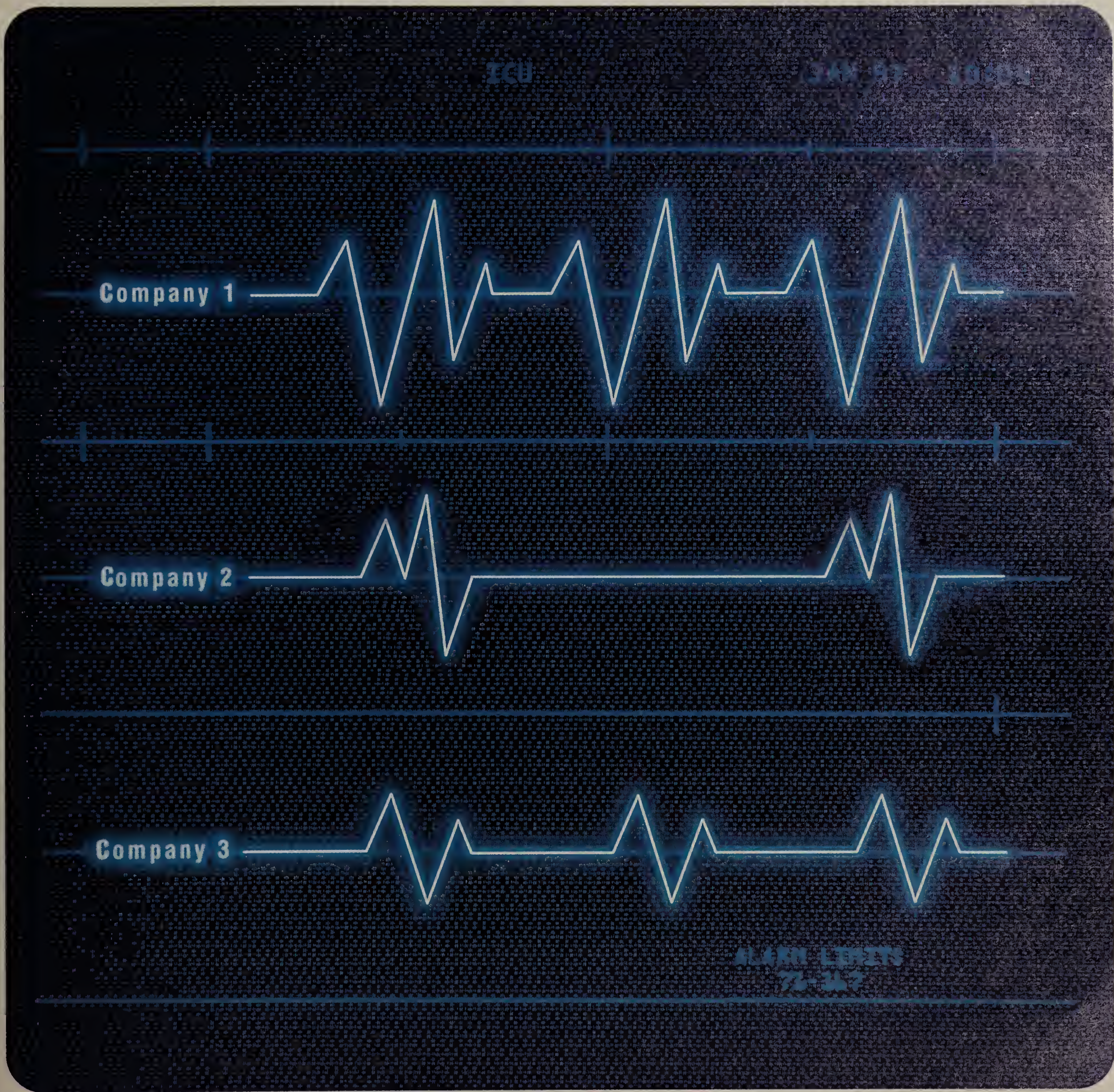
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Push comes to shove: The software industry and you

Here at the Gibbs Institute of Marketing Cybernetics, we have been pondering the changing nature of the software marketplace in the light of online services. Over a particularly nice Merlot, we noted that a new market structure is starting to emerge that promises profound change.

You already can go to cyberspace to test and purchase software, get online tech support (sometimes), download updates, upgrades and enhancements, and do all those things that previously would have been slower and much more aggravating in the real world.

This online activity will radically transform the economics of the software market. Consider the forces at work here: First, there is the online feedback loop. Vendors that launch inferior product tend to be exposed pretty quickly.

This is excellent. Before you opt for any vendor's offering, you would be negligent if you failed to do a search on the 'Net. The commentary online is going to become part of what defines the future software market.

We've never had such tight, responsive correcting forces in the market, and it will have a major impact on vendors. Code quality will have to improve, for a start.

Expect image building that is more like Coca-Cola than today's dweeb pitches.

(Before you point out that this hasn't affected Microsoft so far — for example, you may think that when it comes to Windows 95, stability is a purely theoretical concept — I would point straight back: Microsoft doesn't have competition, particularly in the desktop operating system market. If a real contender ever arises and gains significance, Microsoft will become as driven as every other company.)

Of course, once the sins of vendors are visible, competing vendors will become more aggressive. This is the second force: The online marketplace will demand and create new levels of competition.

While customer service will play a role in this competition, the real battle will be over pricing, with features a near second. Features will always be important, but the de-

mands of the market will be so visible that most vendors in any given segment will have to offer similar features to be players.

Now the third force arises out of the other two. Given a highly visible, highly price-sensitive market with potentially huge sales volumes and massive rewards for the vendors that get it right, how will vendors drive their markets?

Fashion is the answer.

Expect to see a huge increase in software advertising and PR over the next two or three years as vendors try to out-flank one another. Expect image building that is more like Coca-Cola and Calvin Klein than today's dweeb

pitches. (This already started happening; just look at Microsoft's and IBM's current advertising).

Of course, once a real fashion ethic gets into the mix ("And here's Bill, modeling the latest Java compiler..."), expect to see release schedules that will make your head spin.

Along with that will go huge arrays of optional features so that core products can be moved into the market with the most aggressive pricing possible.

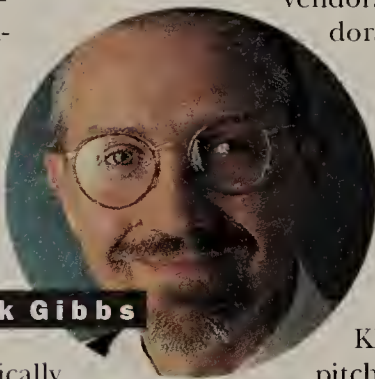
Now, in this environment, knowing what the end user does and is interested in will become incredibly important. Vendors will

want to monitor us as we use their software and, of course, we don't like anything that compromises our privacy, do we? But within three years, expect to see software that can't be used unless you're online so that the vendor can, at the very least, validate your license on demand.

If a vendor can also sell your information to other vendors as direct marketing lists, might the first vendor also offer you significant discounts on products to gain your cooperation. Given, say, Word for Windows 99 for \$50 (or even \$5!), what loss of privacy might you put up with?

So the bottom line is new and titanic market forces (generated by you, the consumer) will push the vendors, and you will be shoved as a consequence, which will make you push back to the vendors, and so on (ol' Norbert Wiener wouldn't be surprised). The question is, how much will you resist the forces the vendors will generate? And how much won't you?

Shove your thoughts by E-mail (nwcolumn@gibbs.com) or push 'em to (800) 622-1108, Ext. 504. Beam me up, Scotty.



Mark Gibbs



'NET BUZZ

The latest on the Internet/intranet industry

By Chris Nerney

SPEAKING ABOUT IPOs An Internet telephony software vendor with less than \$1 million in sales in 1996 has filed for an initial public offering (IPO) of stock.

NetSpeak Corp. plans to offer 2 million shares at \$8 to \$10 per share on an undetermined date, according to documents filed with the Securities and Exchange Commission.

Based in Boca Raton, Fla., NetSpeak was founded in 1995 by three former Telecom Plus International executives, including Stephen Cohen, currently CEO and chair of NetSpeak.

While not a "pure" Internet play — the company also markets LAN and WAN telephony-based products — NetSpeak is known primarily for its WebPhone, a Windows-based computer phone application.

NetSpeak generated \$867,117 in revenue last year and lost \$2.86 million. Despite this less-than-spectacular track record, at least one market analyst thinks the company could pay off for investors.

"Looking at everyone else in this space, they have a legitimate chance to compete and do well," says telephony industry analyst Jeff Pulver.

The telecommunications background of its chief officers is a big plus for NetSpeak, Pulver says. "They understood how the market would evolve," he says.

RIDE A PLANE, SURF THE WEB We will soon have Internet terminals available for travelers at all major airports.

QuickATM Corp. has installed a network of Internet stations at San Francisco International Airport and has plans for more in the next six months for airports serving Los Angeles, New York and Washington, D.C.

Travelers can use the Internet stations to check and send E-mail, surf the Web and access travel information, for a fee starting at \$2.50 and increasing according to the length of time online.

QuickATM, based in Berkeley, Calif., began installing travel information kiosks in major airports and railway stations in 1991.



NOW YOU CAN RULE IN LUXEMBOURG The addition of seven new top-level domains promises to provide more choices for companies and individuals seeking to hang a shingle in cyberspace. But as we all know, more choices can often cause confusion, followed by indecision, despair and death. A pretty steep price for wanting the world to see pictures of you and your Labrador retriever standing at the South Rim, if you ask us.

Fortunately, a new Internet name registry vows to help you avoid this fate by providing comprehensive information on the new domains (.firm, .store, .web, .arts, .rec, .info and .nom) as well as how to register domain names anywhere in the world.

NetNames has just released the **Global Domain Name Report**, which covers filing requirements in 194 countries, along with general info about the domain name system.

Based in London and New York, NetNames essentially is a domain name broker, offering to register (for a fee) multiple domains in foreign countries for corporations and individuals.

NetNames and the report are located at www.netnames.com.

SEEK AND YOU SHALL... UM, SEARCH Infoseek Corp. tomorrow will announce a version of its search technology for use on corporate intranets and large public Web sites.

The Santa Clara, Calif.-based company will then unveil Ultraseek Server to the public next week at Internet World in Los Angeles.

March is "Plant an Unsubstantiated Rumor" month. Celebrate by supplying 'Net Buzz with your most titillating, litigable Internet and intranet news. We promise to misuse it. Contact Chris Nerney at (508) 820-7451 or cnery@nw.com.



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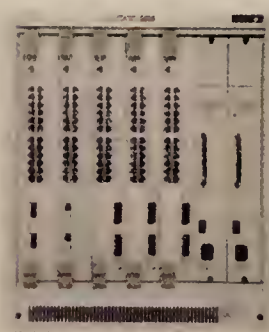
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